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Enumeration and Coded-Wire Tagging of Coho Salmon (*Oncorhynchus kisutch*) Smolts Leaving Black Creek, French Creek, and the Trent River on Vancouver Island During 1989

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ENUMERATION AND CODED-WIRE TAGGING OF COHO SALMON (*Oncorhynchus kisutch*) SMOLTS LEAVING BLACK CREEK, FRENCH CREEK, AND THE TRENT RIVER ON VANCOUVER ISLAND DURING 1989

by

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ABSTRACT

Bocking, R. C., J. R. Irvine, and R. E. Bailey. 1991. Enumeration and coded-wire tagging of coho salmon (*Oncorhynchus kisutch*) smolts leaving Black Creek, French Creek, and the Trent River on Vancouver Island during 1989. Can. Manuscr. Rep. Fish. Aquat. Sci. 2115: 103 p.

Coho salmon smolts leaving Black Creek, French Creek, and the Trent River between April 13 and June 23, 1989 were trapped and coded-wire tagged. At Black Creek, 29,476 coho smolts were tagged, 12,173 smolts were tagged at French Creek, and 12,321 smolts were tagged at Trent River. We estimate that an additional 300, 100, and 500 untagged smolts emigrated from Black Creek, French Creek, and the Trent River, respectively. Mortalities due to trapping and tagging were low (0.4 - 1.3%). Most smolts were age 1 and only at Black Creek did age 2 smolts contribute significantly (23.8%). Black Creek smolts were larger than French Creek smolts, which were larger than Trent River smolts. At each system, but especially at Black Creek, there was a decrease in the mean size of smolts during the run. This decrease has also been observed in previous years, and appears to be due to age 2 smolts emigrating earlier than age 1 smolts. When averaged over the run, sex ratios were not significantly different from 1:1. Fence trapping efficiency tests proved unreliable and suggested that trapping efficiencies were much lower than could reasonably be expected.

RESUME

Bocking, R. C., J. R. Irvine, and R. E. Bailey. 1991. Enumeration and coded-wire tagging of coho salmon (*Oncorhynchus kisutch*) smolts leaving Black Creek, French Creek, and the Trent River on Vancouver Island during 1989. Can. Manuscr. Rep. Fish. Aquat. Sci. 2115: 103 p.

Des smolts de saumon coho des ruisseaux Black et French et de la rivière Trent ont été capturés et marqués avec des micromarques magnétisées codées au cours de leur avalaison, du 13 avril au 23 juin 1989. Les nombres de smolts marqués sont les suivants : 29 476 au ruisseau Black, 12 173 au ruisseau French et 12 321 à la rivière Trent. Nous estimons que 300, 100 et 500 smolts supplémentaires non marqués ont descendu les ruisseaux Black et French et la rivière Trent, respectivement. La mortalité attribuable à la capture et au marquage était faible (entre 0,4 et 1,3%). La plupart des smolts étaient d'âge 1; les smolts d'âge 2 n'étaient présents dans une assez forte proportion (23,8%) que dans le ruisseau Black. Les smolts les plus gros étaient ceux du ruisseau Black et les plus petits, ceux de la rivière Trent. Dans chacun de ces cours d'eau, mais tout spécialement dans le ruisseau Black, la taille moyenne des smolts diminuait au fur et à mesure que le période de l'avalaison avançait. Le même phénomène avait été observé les années précédentes et s'expliquerait par le fait que les smolts d'âge 2 descendent plus tôt dans la saison que ceux d'âge 1. Le rapport moyen des sexes pour toute la période de l'avalaison n'était pas significativement différent de 1:1. Les tests visant à évaluer l'éfficacité des barrières pour la capture des smolts ont montré qu'elles sont peu efficaces, et laissent entendre que les taux de capture étaient beaucoup plus bas que ceux auxquels on pouvait raisonnablement s'attendre.

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INTRODUCTION

Accurate estimates of spawning escapements and fishery exploitation rates are necessary to monitor the effectiveness of fishery management plans. To aid in estimating exploitation rates, large numbers of juvenile Pacific salmon are marked using binary coded-wire tags and released each year (Kuhn et al. 1988). This is a particularly onerous task for coho salmon (*Oncorhynchus kisutch*) since there are approximately 1000 discrete wild stocks in B.C. (Aro and Shepard 1967). To circumvent this problem, it has been suggested that coho populations of a few streams be intensively studied to determine if one coho stock in a defined geographical area can be used as an indicator stock for nearby stream populations (Symons and Waldichuk 1984). These indicator streams could then be monitored for escapement levels, smolt production, and harvest contributions, and more reliable stock-recruitment relationships would be developed.

In 1985, eight streams with hatchery, wild, and enhanced coho populations were chosen for an index study along the east coast of Vancouver Island, in Statistical Area 14. Of the selected systems, five had established hatchery facilities and three were natural systems. The three natural streams selected were Black Creek, French Creek, and the Trent River (Figure 1). Each fall since 1985, adult counting fences have been operated on these three streams for enumeration of coho escapements. Mark-recapture studies have also been carried out each year as a second escapement estimate. In the spring of each year smolt enumeration fences have been used to monitor and coded-wire tag the outmigrating coho smolts (Labelle 1990, Fielden et al. 1989).

This report presents the results of the 1989 coho smolt enumeration program conducted at Black Creek, French Creek, and the Trent River. Major objectives of the research were to:

1. Document the size and age distributions of the smolt outmigrations from each system,
2. Obtain results which will enable an examination of the relationship between adult escapement and smolt production,
3. Coded-wire tag various smolt migration timing and size groups, and
4. Evaluate the effectiveness of fry outplanting.

Achievement of these objectives involved the operation of fences installed to monitor the downstream migration of juvenile salmonids, enumeration of all outmigrants, length, weight, and age sampling of coho smolts, and coded-wire tagging of as large a portion of the coho smolt population as possible. At Black Creek and French Creek, all tagging related data were stratified into tagging periods (Table 1) and all biophysical data were stratified into the broader sampling periods of April

13 - May 10, May 11 - June 2, and June 3 - June 23. At Trent River there were only 2 tagging and sampling periods; April 30 - May 24 and May 25 - June 17.

STUDY STREAMS

Black Creek is a small stream on the east coast of Vancouver Island, approximately 30 km north of Courtenay (Figure 1). The creek is 26 km long, and averages 5-6 m in width. The watershed area is approximately 72.5 km^2. The creek begins in the higher elevations of Mount Washington, and flows in a northeasterly direction to Elma Bay, in the Strait of Georgia (Figure 2). The intertidal section near the mouth is narrow, short (<0.5 km), and relatively flat with sand and mud substrates. The creek varies from a steep gradient mountain stream at higher elevations, to a sluggish meandering stream flowing through agricultural land and swamps, with dense overgrowth of vegetation in its lower elevations. In the lower reaches, the creek includes many lakes, swampy depressions, beaver ponds and several tributaries including Millar and Sayer Creek. Peak discharge is known to reach at least 30 m^3/s during fall and winter floods after heavy rainfall. During summer, stream flow may decrease to negligible levels and cause some sections in the lower reaches to be completely dry.

Black Creek supports resident and anadromous populations of cutthroat (*Oncorhynchus clarki)*, and rainbow trout (*O. mykiss*), as well as a considerably larger population of coho salmon. For its size, Black Creek is an exceptionally good coho producer. During the past 10 years, escapements have been reported to reach 8,400 coho, but fishery officers reported nearly twice this figure in some years prior to 1975 (Hancock and Marshall 1985). Coho smolt production in 1978 and 1979 averaged 48,900 (Clark and Irvine 1989). Labelle (1990) estimated that during 1985, 1986, and 1987, approximately 57,700, 43,900, and 70,000 smolts were produced. In 1988, about 77,000 smolts left Black Creek, and most of these were coded-wire tagged (Fielden et al. 1989).

French Creek is a small stream on the southeast side of Vancouver Island, starting from the eastern slopes of Mount Arrowsmith, and flowing northeasterly until it connects with the Strait of Georgia 2 km west of Parksville (Figure 1). The creek is approximately 20 km long and averages 12 m in width in its middle sections (Figure 3). The intertidal section is approximately 1 km long, 100 m wide, and is characterized by the presence of several small channels meandering through mud flats. Numerous small falls exist in the mainstem from 7-13 km above the mouth. A fishway was installed in 1961 to facilitate passage

over one of the larger falls. The creek branches into two major sections 12.5 km upstream from the mouth, with most of the West fork being inaccessible to the fish because of a 12 m high falls located 400 m upstream from the confluence. Further upstream, the East fork splits into several sections where logging activity takes place. French Creek is characterized as having large seasonal fluctuations in water levels. Discharge during winter floods may exceed 60 m^3/s, and usually decreases to negligible levels during summer.

Mainly because of the abundant vegetation cover, French Creek is a good coho producer, with annual escapement reaching 3,500 fish in the previous 10 years (Hancock and Marshall 1985). Chum salmon (*O. keta*) also spawn in the river, but fishery officer records indicate that chum escapement has declined considerably during the last 10 years to a maximum of 250 fish. The stream also supports resident and anadromous populations of cutthroat, and rainbow trout.

An attempt to enhance the coho population was initiated in 1982 with the construction of a small hatchery near the counting fence (Figure 2). Since then, local volunteers have conducted habitat surveys, collected broodstock, and have raised salmon for subsequent releases into the creek. In 1988, fry were released into the system at Dudley Marsh (Table 2).

Labelle (1990) estimated about 32,000 and 27,000 coho smolts left French Creek during the spring of 1986 and 1987 respectively. Substantial numbers of rainbow and cutthroat trout were also captured in the smolt traps during these seasons. In 1988, about 29,000 coho smolts left French Creek (Fielden et al., 1989).

The Trent is a medium river on the eastern side of Vancouver Island south of Courtenay (Figure 1). The river begins in the Beaufort Mountain range and flows in a northeasterly direction until it enters the Strait of Georgia at Comox Harbour (Figure 4). The total length of the Trent River, including several tributaries in the upper reaches, is approximately 30 km. The intertidal section of the river is approximately 1 km long and 30 m wide. Seven kilometres upstream, Bloedel Creek connects to the mainstem, but is inaccessible to adult coho because of a series of falls and cascades in the lower sections. Two kilometres beyond this connection, a 15 m high falls prevents fish from reaching the upper sections of the river, including its two tributaries; Tremain Creek and Idle Creek. The main section of the river below the falls is 9 km long, with an average width of 16 m. Steep and high banks with very little overgrowth are found along the main section of the river. Throughout most of this area, cover for fish is mainly in the form of instream boulders and logging debris, which is particularly abundant in

the 1-2 km section upstream of the river mouth. The river bed is composed mostly of bedrock with rocky outcrops and boulders.

Seasonal fluctuations in water levels are pronounced, and large floods are common particularly during the winter period. Flows exceeding 150 m^3/s have been recorded during fall and winter months, causing extensive gravel movement, logjam shifts, and scouring in the lower reaches (Labelle 1990). During the summer, flows occasionally decrease to negligible levels, with several sections in the lower reaches becoming dry.

Because of the lack of cover, spawning substrate, and rearing habitat, the system is not a good coho producer. During the 1974-1984 period, coho escapements rarely exceeded 350 fish (max. 1,000, Hancock and Marshall 1985), while those of chum salmon reached 3,000 fish. The river also supports resident and anadromous populations of cutthroat, and rainbow trout, as well as a small number of pink salmon. Attempts have been made to enhance coho and steelhead by stocking the Bloedel Creek and Bradley Lake tributaries. Members of the Courtenay Fish & Game Club have been releasing juvenile coho on a regular basis since 1981. In 1988, fry were released into the system in 4 areas; 1) the upper mainstem above the main falls, 2) China Creek, 3) Bloedel Creek, and 4) Bradley Lake (Table 2).

Labelle (1990) estimated that approximately 16,000, 14,000, and 22,000 coho smolts left Trent River during 1985, 1986, and 1987 respectively. In 1988, the smolt production was about 23,000 (Fielden et al. 1989).

METHODS

FENCE OPERATIONS

We operated downstream juvenile fences (Conlin and Tutty 1979) at Black Creek from April 13 to June 23, 1989. The Black Creek smolt fence was a V design and was installed approximately 20 m downstream from the Seaview Road bridge, 0.5 km upstream from the mouth, with 3 trap boxes located just upstream of the adult fence abutments. This location is beyond tidal influence and has a stream width of 16 m. The stream bed is stable and composed of a mixture of small rocks, cobble and gravel. This is the same location used previously by Clark and Irvine (1989), Fielden et al. (1989), and Labelle (1990).

Six holding boxes were located downstream of the trap to hold coho smolts for sampling and tagging. A separate trap consisting of a broomstick panel, 4 m long, that extended from the stream bank to one side of the juvenile trap boxes was installed to intercept steelhead adults moving upstream.

On June 19, because of extremely low water levels, a sandbag dam was built across the wetted width of the creek on top of the adult fence concrete foundation, just below the downstream fence. The dam was made 'fish tight' with plastic sheeting and gravel. A tunnel of Big-O tubing was constructed at the deepest part of the dam (at the adult fence trap box site) to direct water and fish into a single trap box. The trap box was situated just behind the dam in about 0.5 m of water. This arrangement allowed the continued trapping of coho smolts until June 23.

At French Creek, we installed a V fence approximately 1.5 km from the river mouth (Fielden et al. 1989, Labelle 1990), above tidal influence. Stream width is approximately 20 m, and the stream bed is composed of gravel, cobble, and small rocks. The upstream end of the fence was near the adult fence abutments. The French Creek smolt fence was operated from April 17 to June 17.

Four holding boxes were used at French Creek for sorting, sampling, and tagging. These were located just downstream of the smolt trap. An adult trap, similar to that described for Black Creek was also installed to facilitate passage and capture of upstream migrating adult fish.

At the Trent River, 2 W style fences were installed approximately 400 m upstream from the Highway 19 bridge. At this location, the mainstem splits into 2 channels around a small island. This location has good access and lies beyond tidal influence. The presence of 2 distinct channels required the construction of 2 separate structures, each operated independently. At these locations, channel widths ranged from 20 to 50 m, with a stream bed characterized by an unstable mixture of rocks, cobble and fine gravel. The Trent River fences were operated from April 30 to June 17.

Four holding boxes were required at the Trent River and were located downstream of the smolt trap on the north channel. An adult trap box was also placed at the upstream apex of each 'W' configuration to intercept any upstream steelhead migrants.

BIOPHYSICAL OBSERVATIONS

We recorded water temperatures, water levels, and weather conditions daily between 07:00 and 09:00 h. A maximum-minimum thermometer (± 0.25°C) was used to measure daily fluctuations in temperature.

Water levels were monitored to the nearest 0.01 m. Water levels at Black Creek were recorded from two staff gauges, one located 200 m upstream from the Seaview Road bridge and outside the influence of the smolt fence, and one located at the Seaview Road bridge within the influence of the fence. Data presented in this report are from the former. Water levels at French creek were also recorded from two gauges, one located at the adult fence abutment (within the influence of the smolt fence), and one located 100 m downstream of the juvenile fence (outside the area of influence). The data presented in this report are from the latter. The staff gauges on the Trent River were located 100 m downstream from the E&N railway trestle (150 m upstream from the smolt fences) and at the highway bridge (200 m downstream of the fences). Both these gauges were outside the influence of the smolt fences. Only data from the former are presented here.

Discharge measurements for Black Creek and French Creek were obtained from the Water Survey of Canada (Stations #08HD014 and #08HB038). Discharge of the Trent River was estimated under 3 separate flow conditions between April and June of 1989, and on 2 occasions between October and December of 1989, near the upper staff gauge. Measurements were made using a Gurley No. 625 Pygmy type current meter, except on one occasion of high flows when a Gurley 650 metre with 35 lb bomb was deployed from the Highway 17 bridge. Water depths and velocities were recorded at 1 m intervals along each transect. Velocities were measured at 0.6 times the depth from the water surface.

The percentage cloud cover, wind direction, and wind speed were estimated visually. Precipitation strength was recorded on a scale of 1 to 5 with 1 being zero precipitation and 5 being heavy precipitation.

TRAPPING EFFICIENCY

The trapping efficiency of each fence was estimated twice, with approximately one month separating each test. In most cases, the caudal fins of between 100 and 150 coho smolts were clipped and these fish were released about 150m upstream of the fence. The one exception to this was for the first

efficiency test at the Trent River, when 295 smolts were released upstream. Different caudal fin clips were used for each test in each system (upper and lower caudal). Smolts subsequently captured at the fences were carefully examined for fin clips.

FISH ENUMERATIONS

Each morning, at each site, all of the coho smolts captured since the previous day were placed in a mild anaesthetic (2-phenoxy ethanol) and the number of coho smolts was recorded, including mortalities. Coho smolts were identified as juveniles >70 mm in length. Coho smolts at Black Creek were counted as either small (<120 mm in length) or large (>=120 mm in length). Coho smolts at French Creek and the Trent River were counted as either wild (no obvious fin clips) or hatchery outplants (various fin clips depending on release date or location, Table 2). All hatchery outplanted coho smolts were identified according to the various fin clips (i.e., left ventral, right maxillary, etc.). Counts of the number of coho caught were verified by the tagging machine count.

All other downstream migrating fish were counted and released below the fence. We assumed that any adult cutthroat or steelhead caught in the downstream traps were kelts (spawned out). Upstream migrating steelhead trout caught in the broomstick traps were counted and released above the fence.

BIOSAMPLING

A random sample of up to 25 coho smolts were selected from each day's catch. These fish were anaesthetized in 2-phenoxy ethanol, measured for fork-length and weighed using a Libra 65001 scale (+/- 0.1 g). The mean smolt lengths and weights were calculated for wild and outplanted smolts, each age class, and sampling period. A final stratified mean for the entire run was determined according to methods described in Cochran (1977).

Scale sampling procedures followed the stratified method of Ketchen, described by Ricker (1975). We attempted to collect 10 scale samples from each 5 mm size class of smolts within each tagging time period (described below). Smolts of the required sizes were collected from the catch when random samples failed to provide the necessary sizes. On some days, when water temperatures were high, catches were high, and/or the fish appeared stressed, fish that were sampled for length and weight

were released untagged to reduce the potential for mortalities. Scale samples were interpreted by personnel at the Department of Fisheries and Oceans scale lab at the Pacific Biological Station. Ages of smolts were stratified by sampling period.

Approximately 150 coho smolts were also sampled from each system for sex ratios. These fish originated largely from mortalities incurred during the trapping operations or from tag placement checks. We stratified the sex samples into the three main sampling periods throughout the smolt migration.

CODED-WIRE TAGGING

Coho smolts were removed from the smolt trap boxes, sorted according to size (Black Creek) or origin (wild versus outplants at French Creek and the Trent River), and held in holding boxes out of the main stream current until tagging. Smolts were never held longer than 36 hours prior to tagging. Coded-wire tagging was performed by an experienced tagger using a Northwest Marine Technology Ltd. Mark IV tagging machine. All tagged fish had their adipose fins removed. Two-phenoxy ethanol was used to anaesthetize the smolts prior to tagging. Tag timing periods for each system (Table 1) were established during the 1988 study season (Fielden et al. 1989).

Black Creek coho smolts were tagged with separate tag codes during seven different run timing periods (Table 1). Within each tagging period, smolts greater than or equal to 120 mm, and smolts less than 120 mm were also tagged with different codes. Smolts were anaesthetized and then sorted by hand into the two size categories. Smolts from one of the size categories were then tagged while the other size category was held in a separate holding pen for tagging later in the day. This latter group of smolts was, therefore, subjected to two anaesthetic baths. No differential mortality was observed between the two size categories over a 24 hour holding period. In total, there were 14 different tag codes used at Black Creek. Tagging at Black Creek was done daily, except for a few instances when smolts were held for 2 days before tagging.

The French Creek wild coho smolt migration was divided into 4 timing periods. Smolts migrating within these timing periods were tagged with different codes (Table 1). In addition, we tagged all hatchery outplanted coho with a single, distinct tag code. There were a total of five tag codes used at French Creek in 1989. Wild and ouplanted coho were sorted by hand as they were dipped from the trap boxes and held in separate holding boxes until tagging. Tagging was done at French Creek every second day.

There were two tagging periods at the Trent River. Within each of these periods, coho smolts were tagged as either wild or hatchery outplants (Table 1). Because of the large numbers of ouplanted coho smolts, and the four different fin clips to watch for (Table 2), all coho smolts were sorted under anaesthetic prior to tagging. The smolts were then anaesthetized again for tagging. For those smolts held 2 days prior to tagging, there was a long recovery period (24-36 hours) between anaesthetic baths. For those smolts captured and tagged on the same day, there was as little as 4 hours recovery period between doses. No mortalities were observed either in smolts held 16 hours prior to tagging, or in smolts held 24 hours for tag retention checks.

TAG RETENTION TESTS

Tag retention checks were performed six times at Black Creek, twice at French creek, and once at the Trent River. For all tests, 100 tagged fish were held for 48 hours, then retested for tag presence.

RESULTS

BIOPHYSICAL OBSERVATIONS

Daily biophysical measurements are provided in Appendix A. Water temperatures at Black Creek ranged from an average minimum of 9.3°C in mid April to an average maximum of 16.4°C in June. Water temperatures at French Creek were somewhat colder, ranging from a mean minimum of 7.7°C in late April - early May to 16.4°C in June. Water temperatures in the Trent River were similar to French Creek (Figure 5).

Water levels in each system dropped relatively steadily over the study (Figure 5). There were no flood events at any of the systems during the study period. Black Creek water levels measured at the upstream gauge (No. 2) ranged from a maximum of 50.0 cm recorded April 21 and April 22 to a minimum of 11.3 cm recorded for June 12 - June 18 (Appendix 1). French Creek water levels recorded at the downstream gauge (No. 2) varied from a maximum of 62.0 cm from April 21 to 25.0 cm on June 12 - June 13. Water levels at the Trent River did not change as much as at Black Creek and French Creek. Levels recorded at the upstream

gauge (No. 2) ranged from a maximum of 60.0 cm on April 25 to a low of 30.0 cm on June 12 (Appendix 1).

Preliminary Water Survey of Canada (WSC) daily discharge data for the Sturgess Road station on Black Creek and the Coombs station on French Creek are shown in Figure 6. Discharge of Black Creek ranged between 0.0 m^3s^{-1} and 0.96 m^3s^{-1} with the peak occurring on April 22. Discharge of French Creek ranged between 0.05 m^3s^{-1} and 2.78 m^3s^{-1} with the peak on April 21. Figure 7 shows the stage-discharge relations for Black Creek, French Creek, and the Trent River. Trent River discharge peaked on April 25 and ranged between 1.45 m^3s^{-1} and 3.35 m^3s^{-1}. Discharge estimates for Black Creek and French Creek (Figure 6) are less than the flow would have been at the fences because the WSC sampling stations are several kilometres upstream of the fence sites.

TRAPPING EFFICIENCY

The number of recaptures of marked coho smolts released upstream of the fences varied among systems (Table 3). The highest recaptures (97.0%) were for smolts released on April 27 in Black Creek. Recaptures were high for each test in French Creek. At the Trent River, a smaller proportion of the smolts released upstream were recaptured.

FENCE ENUMERATIONS

Coho smolts

Total daily catches of juvenile coho are provided in Appendix B. A total of 29,862 coho smolts were counted through the Black Creek fence between April 13 and June 23 (Table 4). During this period, there were 107 pre-tagging mortalities and 250 smolts which escaped during handling prior to tagging. The study period seemed to cover most of the migration, since few smolts were trapped at the start and end of the trapping period (Figure 8a). The migration of coho smolts at Black Creek was roughly bimodal with the first peak of migration on May 11 and a larger peak on May 25. Over 44.0% of the entire run of smolts were caught between May 20 and June 2 (Table 4). Small coho (<120 mm fork-length) comprised 66.2% of the total population.

A total of 12,337 coho smolts were captured at French Creek between April 17 and June 17 (Table 5). There were 70 pre-tagging mortalities and 82 smolts that escaped. The migration of

coho smolts out of French Creek was unimodal with the peak of migration occurring on May 16 (Figure 8b). It appears that the fence was operating during virtually all of the migratory period. Nearly 50% of the migration occurred between May 20 and June 2. Wild coho smolts comprised 93.7% of the total smolts enumerated at the fence, with outplanted coho comprising the remainder. The outplanted coho smolts in French Creek migrated downstream much earlier than the wild coho smolts (Figure 9a); 92% of the outplanted fish captured were counted prior to May 10. Of these hatchery outplanted coho, the majority (81.3%) were right ventral clipped or age 1 (Table 7, Figure 10a). Age 2 outplants comprised the remaining 18.7% of the outplanted smolt population.

A total of 12,703 coho smolts were captured at the Trent River fences between April 23 and June 21 (Table 6). There were 209 pre-tagging mortalities and 158 smolts escaped. The timing of migration of coho smolts from the Trent River appeared unimodal but less peaked than for French Creek (Figure 8c). No peak of migration could be clearly defined: Over 500 smolts were captured on six separate occasions. Based on the distribution of catches over time, it is possible that some smolts emigrated prior to the fence being installed. Outplanted coho smolts accounted for 71.0% of the total. Of these, the majority were right ventral clips (50.0%), followed by left ventral clips (26.7%), right maxillary clips (13.6%), and left maxillary clips (9.7%) (Table 7). The timing of migration for Trent River wild and outplanted coho smolts was similar (Figure 9b), as was the timing of the four outplanted groups (Figure 10b).

OTHER SPECIES

Juvenile steelhead and cutthroat trout were caught in each system as well as some kelts of each species. The largest number of juvenile steelhead and cutthroat was caught at French Creek. Cottids, lampreys, and sticklebacks were also caught in all three systems, and a few chum fry were captured at French Creek and the Trent River (Table 8, Appendix C).

BIOSAMPLING

Age

The calculated age-length distributions of wild smolts leaving Black Creek, French Creek, and the Trent River are given in Tables 9, 10, and 11 respectively. These data were used to generate the length-frequency histograms presented later in this

report. Only randomly sampled smolts were used to calculate percentage contributions of each age group to the total smolt population in each system.

The freshwater age structure of Black Creek smolts, averaged over the entire run, was 0.7% age 0, 84.7% age 1, 15.1% age 2, and 0.2% age 3. The proportion of the three main age classes (age 0:age 1:age 2) changed from 0:78:21 in period 1, to 0:88:12 in period 2, and to 1:98:2 in period 3. Differences in proportions of the age classes among timing periods were significant (χ^2 = 56.0, df=2, p<0.001) indicating that older smolts tended to migrate downstream earlier than age 1 smolts.

The average freshwater age structure of wild French Creek smolts was 95.0% age 1 and 5.0% age 2. The proportion of age 1 to age 2 smolts changed from 90:10 in period 1, to 96:4 in period 2, and to 98:2 in period 3. Again, these differences were significant (χ^2 = 18.3 df=2, p<0.001) and indicated that most older smolts migrated early in the run.

For wild smolts leaving the Trent River, the average freshwater age structure was 97.2% age 1 and 2.8% age 2. The proportion of age 1 to age 2 smolts was 95:5 in period 1 and 99:1 in period 2. The difference in age ratios between sample periods was also significant (χ^2 = 6.7, df=1, p<0.01).

Length and Weight

The stratified mean fork-length of the Black Creek coho smolt population was 125.9 mm and the mean weight was 17.9 g (Table 12). The mean length of age 2 fish and large one year old smolts decreased during the study, while the mean length and weight of small one year old coho smolts remained relatively constant (Table 12, Figures 11 and 12). For age 2 smolts less than 120 mm in length, the mean length and weight during sampling periods 1 and 2 were significantly different from each other (Neuman-Keuls test, P<0.05). The mean length and weight of ages 1 and 2 smolts larger than 120 mm were significantly different among sampling periods 1 and 2 and periods 1 and 3 (Neuman-Keuls test, P<0.05). Variability in the lengths of Black Creek coho smolts decreased as the migration progressed (Figure 13).

The stratified mean fork-length of the French Creek coho smolt population was 111.0 mm and the mean weight was 14.4 g (Table 13). The mean length and weight of wild coho smolts decreased during the run (Figures 14 and 15), but the decrease was not significant (Neuman-Keuls text, P >0.05). The range in the size of coho smolts decreased during the run (Figure 16). Outplanted coho smolts tended to be larger than the same age of wild coho smolts (Table 13).

The stratified mean fork-length of the Trent River coho smolt population was 101.3 mm and the mean weight was 9.5 g (Table 14). The mean length and weight of wild coho smolts did not change significantly over the period of migration (Figures 17 and 18) although the length-frequency distribution became somewhat narrower (Figure 19). Age 1 wild coho smolts were slightly smaller than age 1 outplanted coho smolts.

Sex

A total of 112 Black Creek smolts, 104 French Creek smolts, and 110 Trent River smolts were sexed during this study. Although the samples taken were not random, the collection of specimens was interspersed throughout the study period. Such sampling should have minimized any potential biases due to changes in sex ratios over the period of sampling. Males tended to be more abundant than females at Black Creek (53.3:46.7), while females were much more abundant than males at the Trent River (39.6:60.4) (Table 15). The ratio of males to females at French Creek was essentially 50:50. There were no significant differences between the mean length of females and males at any of the systems.

CODED-WIRE TAGGING

Tag Retention

Tag retention tests were performed six times at Black Creek, twice at French Creek, and once at the Trent River. Tag retention was similar at all three systems and did not vary over time (Table 16). The average retention at each system was 99.0%. This number should be used when correcting coded wire tag release data for this study.

Coded-Wire Tag Releases

Total releases of coded wire tagged coho smolts at each system are given in Table 17. A total of 29,476 Black Creek smolts were released with tags, 12,173 French Creek coho smolts were tagged and released, and 12,321 Trent River smolts were tagged and released.

DISCUSSION

Substantially fewer coho salmon smolts left Black and French Creeks during 1989 than in previous years (Fielden et al. 1989, Labelle 1990). This is attributed to the abnormally low escapement to these systems during 1987 (Labelle 1990).

We feel that our traps caught almost all the smolts leaving each system. However, trapping efficiency was estimated to range between 50 and 97%. There are two possible explanations for this apparent discrepancy: 1) some of the marked smolts released upstream of the fences remained there throughout the study, and 2) marked smolts were undetected at the fence. It is impossible to know the extent of residualism by marked smolts above the fence. No holes were ever found during any of the numerous maintenance checks of the fences. However, minks were observed on or around the trap boxes along with smolt carcasses on several occasions.

In 1989 we were able to accurately estimate the contribution of hatchery outplanted coho to the total smolt outmigrations at French Creek and the Trent River. Smolts of outplanted origin made up a relatively minor proportion of the smolts leaving French Creek (6.3%), while the proportion of outplanted fish at the Trent River was larger (71%). This is partly because fewer fry were outplanted into the French Creek drainage than the Trent River drainage. In addition, it may have been more difficult for fry in Dudley Marsh (French Creek) to leave than for fry stocked at the Trent River watershed sites.

The overwinter survival of hatchery outplanted coho within the Trent River watershed varied among release sites. Minimum overwinter survivals were 13.4% for fry released in Bradley Lake, 25.1% for fry released in Bloedel Creek, 12.5% for fry released in China Creek, and 17.5% for fry released in the upper Trent River mainstem (from Tables 2 and 7). Smolts of outplanted and wild origin leaving the Trent River were coded-wire tagged with separate tag codes and we will be able to determine the percentage of each type of smolts captured in the fishery, exploitation rates, and survivals to escapement.

Most smolts leaving each system were 1 year old, and only at Black Creek did 2 year old smolts contribute significantly to the population. Older smolts tended to leave each system earlier than age 1 fish. Previous studies had documented a decrease in the mean length of smolts at Black Creek over the period of trapping (Fielden et al. 1989, Labelle 1990). In 1989 we detected a similar decrease in the size of smolts, caused in part by the generally earlier migrating age 2 smolts which comprised 23.8% of the 1989 smolts population. A decrease

in mean smolt size over time was not significant at French Creek or the Trent River, possibly because there were very few age 2 smolts in either of those systems.

In general, hatchery outplanted coho tended to be larger than wild coho, and this difference was more pronounced at French Creek than at the Trent River. However, none of these differences were significant.

Black Creek smolts (age specific) tended to be larger than French Creek smolts which were larger than Trent River smolts. It is not possible to know whether these differences are the result of varying quality freshwater rearing habitat, and/or water temperatures, which are higher in Black Creek. The differences in size of smolts between systems could also be of genetic origin.

Coded-wire tag releases of coho smolts were 29,476, 12,173, and 12,321 from Black Creek, French Creek, and the Trent River, respectively. A factor of 0.99 should be applied to these numbers to account for tag loss when determining coded wire tag contributions to catch and escapement data. We estimate that an additional 300, 100, and 500 untagged smolts emigrated from Black Creek, French Creek, and the Trent River, respectively. Smolts from each system were tagged with different tag codes for different time periods of the outmigration. This stratification of tag codes will allow us to compare ocean survival rates and harvest rates among groups of smolts.

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REFERENCES

Aro, K.V., and M.P. Shepard. 1967. Pacific salmon in Canada. Intern. North Pac. Fish. Comm. Bull. 23: 225-327.

Clark, D.G., and J.R. Irvine. 1989. Enumeration and coded-wire tagging of coho salmon (Oncorhynchus kisutch) smolts leaving Black Creek, Vancouver Island, during 1978 and 1979, their subsequent distribution in sport and commercial fisheries, and escapement to the creek in 1978-1980. Can. MS Rep. Fish. Aquat. Sci. 2017: 45 p.

Cochran, W.C. 1977. Sampling techniques. Third edition. John Wiley & Sons. New York. 413 p.

Conlin, K. and B.D. Tutty. 1979. Juvenile salmonid field trapping manual. Fish. Mar. Serv. MS. Rep. 1530: 136 p.

Fielden, R.J., G.J. Birch, and J.R. Irvine. 1989. Enumeration and coded-wire tagging of coho salmon (Oncorhynchus kisutch) smolts leaving Black Creek, French Creek and the Trent River, Vancouver Island, during 1988. Can MS Rep. Fish. Aquat. Sci. 2018: 85 p.

Hancock, M.J., and D.E. Marshall. 1985. Catalogue of salmon streams and spawning escapements of Statistical Area 14 Comox-Parksville. Can. Data Rep. Fish. Aquat. Sci. 504: 134 p.

Kuhn, B. R., L. Lapi, and J. M. Hamer. 1988. An introduction to the Canadian database on marked Pacific salmonids. Can. Tech. Rep. Fish. Aquat. Sci. 1649: viii + 56 p.

Labelle, M. 1990. A comparative study of coho salmon populations of S. E. Vancouver Island, British Columbia: Juvenile outmigration, coded-wire tagging and recovery, escapement enumeration and stock composition at Black Creek, Trent River and French Creek, 1984-1988. Can. Tech. Rep. Fish. Aquat. Sci. 1722: 148 p.

Ricker, W.E. 1975. Computation and interpretation of biological statistics of fish populations. Bull. Fish. Res. Bd. Can. 191. 382 p.

Symons, P.E.K., and M. Waldichuk. 1984. Proceedings of the workshop on stream indexing for salmon escapement estimation. Can. Tech. Rep. Fish. Aquat. Sci. 1326: 1-22.

Table 1. Tagging periods and codes of coho smolts coded wire tag groups from Black Creek, French Creek, and the Trent River, 1989. Outplanted fish represent hatchery releases as per Table 2.

System	Coho Group	Tag Code	Tagging Period		
Black Creek	small/wild	8/26/15	Apr-13	-	Apr-19
		8/26/45	Apr-20	-	Apr-30
		8/25/14	May-01	-	May-10
		8/26/31	May-11	-	May-15
		8/16/11	May-16	-	May-19
		8/16/10	May-20	-	Jun-02
		8/16/06	Jun-03	-	Jun-23
	large/wild	8/26/46	Apr-13	-	Apr-19
		8/25/16	Apr-20	-	Apr-30
		8/16/09	May-01	-	May-10
		8/26/39	May-11	-	May-15
		8/26/17	May-16	-	May-19
		8/26/18	May-20	-	Jun-02
		8/26/20	May-20	-	Jun-02
		8/26/38	Jun-03	-	Jun-23
French Creek	wild	8/26/43	Apr-17	-	May-10
		8/25/11	May-11	-	May-19
		8/25/13	May-20	-	Jun-02
		8/26/44	Jun-03	-	Jun-17
	outplanted	8/26/42	Apr-17	-	Jun-17
Trent River	wild	8/25/05	Apr-30	-	May-24
		8/26/41	May-25	-	Jun-17
	outplanted	8/26/40	Apr-30	-	May-24
		8/26/23	Apr-30	-	May-24
		8/25/07	May-25	-	Jun-17

Table 2. Hatchery coho fry releases at French Creek and the Trent River in 1987 and 1988.

System	Release Date	Release Site	Number Released	Mean Size (g)	Fin Clip
French Creek	Jun-87	Dudley Marsh	10400	1.8	Left ventral
	Jun-88	Dudley Marsh	4630	2.3	Right ventral
Trent River	Jun-88	Bradley Lake	18000	3.5	Left ventral
	Jun-88	Bloedel Creek	18000	3.5	Right ventral
	Jun-88	China Creek	7000	3.5	Left maxillary
	Jun-88	Trent R. headwaters	7000	3.5	Right maxillary

Table 3. Results of trap efficiency tests conducted at Black Creek, French Creek, and the Trent River, 1989.

System	Date of Release	Number Released	Fin Clip	Number Recovered	Date of Last Recovery	% Recovered
Black Creek	Apr-27	100	upper caudal	97	May-30	97.0
	May-19	100	lower caudal	79	Jun-06	79.0
French Creek	May-03	117	upper caudal	107	May-31	91.5
	May-18	149	lower caudal	137	Jun-02	91.9
Trent River	May-03	295	upper caudal	148	Jun-06	50.2
	May-20	100	lower caudal	68	Jun-12	68.0

Table 4. Coho smolt catches at Black Creek by tagging period, 1989. Mortalities include smolts found in trap boxes as well as mortalities due to handling.

Tagging Period	Small	Large	Total	Pre tagging Mortalities	Number Escapees	Available for Tagging
Apr 13 - Apr 19	13	163	176	0	0	176
Apr 20 - Apr 30	743	2808	3551	6	13	3532
May 1 - May 10	2168	3208	5376	22	24	5330
May 11 - May 15	2891	825	3716	27	13	3676
May 16 - May19	1535	485	2020	11	48	1961
May 20 - Jun 2	11006	2322	13328	27	93	13208
Jun 2 - Jun 23	1420	275	1695	14	59	1622
Total	19776	10086	29862	107	250	29505

Table 5. Coho smolt catches at French Creek by tagging period, 1989. Mortalities include smolts found in trap boxes as well as mortalities due to handling.

Tagging Period	Wild	Outplanted	Total	Pre tagging Mortalities	Number Escapees	Available for Tagging
Apr 17 - May 10	1797	717	2514	39	27	2448
May 11 - May 19	4036	52	4088	14	38	4036
May 20 - Jun 2	5265	11	5276	14	13	5260
Jun 2 - Jun 17	457	2	459	3	4	452
Total	11555	782	12337	70	82	12196

Table 6. Coho smolt catches at Trent River by tagging period, 1989. Mortalities include smolts found in trap boxes as well as mortalities due to handling.

Tagging Period	Wild	Outplanted	Total	Pre tagging Mortalities	Number Escapees	Available for Tagging
Apr 23 - May 24	1676	5811	7487	95	110	7282
May 25 - Jun 21	2004	3212	5216	114	48	5054
Total	3680	9023	12703	209	158	12336

Table 7. Outplanted coho smolt catches at French Creek and the Trent River, by clip and sample period, 1989.

System	Clip	Sample Period	Total Catch
French Creek	Left Ventral	Apr 17-May 10	139
		May 11-Jun 2	6
		Jun 3-Jun 20	1
	Total		146
	Right Ventral	Apr 17-May 10	578
		May 11-Jun 2	57
		Jun 3-Jun 20	1
	Total		636
Total			782
Trent River	Left Ventral	Apr 23-May 24	1031
		May 25-Jun 21	1380
	Total		2411
	Right Ventral	Apr 23-May 24	3550
		May 25-Jun 21	960
	Total		4510
	Left Maxillary	Apr 23-May 24	733
		May 25-Jun 21	142
	Total		875
	Right Maxillary	Apr 23-May 24	497
		May 25-Jun 21	730
	Total		1227
Total			9023

Table 8. Total number of non-coho fish caught in Black Creek, French Creek, and the Trent River, April - June, 1989. All adult steelhead and cutthroat were caught moving upstream and all kelts were caught moving downstream.

System	Species	Life Stage	Total Number Caught
Black Creek	Steelhead	parr	3
		smolt	84
		kelt	3
	Cutthroat	smolt	17
		kelt	116*
	Cottids	-	733
	Lamprey	-	25
	Stickleback	-	117
French Creek	Steelhead	fry	105
		parr	1187
		smolt	2888
		adult	2
		kelt	16
	Cutthroat	parr	23
		smolt	520
		adult	4
		kelt	14
	Cottids	-	824
	Lamprey	-	12
	Stickleback	-	798
	Chum	fry	68
Trent River	Steelhead	fry	9
		parr	443
		smolt	581**
		kelt	14
	Cutthroat	fry	3
		parr	63
		smolt	24
		kelt	2
	Cottids	-	1145
	Lamprey	-	5
	Stickleback	-	8
	Chum	fry	2501

* 85 of these were hatchery outplanted cutthroat

** 36 of these were hatchery outplanted steelhead

Table 9. Age-length distribution of Black Creek wild coho smolts, by sample period, 1989. Age representation determined according to Ketchen's stratified subsampling method (Ricker 1975, p. 67).

Sample Period	Size-Class (mm)	Age Sample (X)	Age-groups in X				Length Sample (Y)	Calculated Age Representation in Y			
			0	1	2	3		0	1	2	3
Apr 13-May 10	<80	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	80	1	0	1	0	0	1	0.0	1.0	0.0	0.0
	85	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	90	1	0	1	0	0	2	0.0	2.0	0.0	0.0
	95	5	0	5	0	0	7	0.0	7.0	0.0	0.0
	100	9	0	7	2	0	11	0.0	8.6	2.4	0.0
	105	15	0	10	5	0	35	0.0	23.3	11.7	0.0
	110	12	0	7	5	0	57	0.0	33.3	23.8	0.0
	115	12	0	9	3	0	84	0.0	63.0	21.0	0.0
	120	10	0	10	0	0	102	0.0	102.0	0.0	0.0
	125	11	0	10	1	0	86	0.0	78.2	7.8	0.0
	130	9	0	9	0	0	69	0.0	69.0	0.0	0.0
	135	11	0	9	2	0	58	0.0	47.5	10.5	0.0
	140	8	0	5	3	0	29	0.0	18.1	10.9	0.0
	145	11	0	8	3	0	21	0.0	15.3	5.7	0.0
	150	13	0	7	5	1	15	0.0	8.1	5.8	1.2
	155	3	0	1	2	0	3	0.0	1.0	2.0	0.0
	160	6	0	1	5	0	7	0.0	1.2	5.8	0.0
	165	4	0	0	3	1	4	0.0	0.0	3.0	1.0
	170	4	0	2	2	0	5	0.0	2.5	2.5	0.0
	175	4	0	0	4	0	4	0.0	0.0	4.0	0.0
	180	1	0	0	1	0	1	0.0	0.0	1.0	0.0
	185	4	0	1	3	0	5	0.0	1.3	3.8	0.0
	190	2	0	0	2	0	3	0.0	0.0	3.0	0.0
	195	1	0	0	1	0	1	0.0	0.0	1.0	0.0
	>200	7	0	1	6	0	8	0.0	1.1	6.9	0.0
Total		164	0	104	58	2	618	0.0	483.3	132.5	2.2
May 11-Jun 2	<80	1	0	1	0	0	0	0.0	0.0	0.0	0.0
	80	3	0	3	0	0	0	0.0	0.0	0.0	0.0
	85	5	0	5	0	0	6	0.0	6.0	0.0	0.0
	90	8	0	7	1	0	14	0.0	12.3	1.8	0.0
	95	9	0	8	1	0	32	0.0	28.4	3.6	0.0
	100	13	0	12	1	0	53	0.0	48.9	4.1	0.0
	105	13	0	11	2	0	121	0.0	102.4	18.6	0.0
	110	10	0	9	1	0	143	0.0	128.7	14.3	0.0
	115	12	0	12	0	0	113	0.0	113.0	0.0	0.0
	120	10	0	7	3	0	50	0.0	35.0	15.0	0.0
	125	12	0	9	3	0	28	0.0	21.0	7.0	0.0
	130	8	0	4	4	0	11	0.0	5.5	5.5	0.0
	135	5	0	3	2	0	5	0.0	3.0	2.0	0.0
	140	2	0	2	0	0	2	0.0	2.0	0.0	0.0
	145	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	150	0	0	0	0	0	0	0.0	0.0	0.0	0.0

Table 9 (cont). Age-length distribution of Black Creek coho smolts, by sample period, 1989. Age representation determined according to Ketchen's stratified subsampling method (Ricker 1975, p. 67).

Sample Period	Size-Class (mm)	Age Sample (X)	Age-groups in X				Length Sample (Y)	Calculated Age Representation in Y			
			0	1	2	3		0	1	2	3
	155	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	160	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	165	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	170	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	175	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	180	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	185	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	190	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	195	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	>200	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Total		111	0	93	18	0	578	0.0	506.2	71.8	0.0
Jun 3-Jun 23	<80	1	1	0	0	0	1	1.0	0.0	0.0	0.0
	80	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	85	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	90	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	95	3	0	3	0	0	4	0.0	4.0	0.0	0.0
	100	9	0	9	0	0	21	0.0	21.0	0.0	0.0
	105	11	0	11	0	0	43	0.0	43.0	0.0	0.0
	110	12	0	12	0	0	47	0.0	47.0	0.0	0.0
	115	13	0	13	0	0	49	0.0	49.0	0.0	0.0
	120	5	0	5	0	0	10	0.0	10.0	0.0	0.0
	125	5	0	4	1	0	8	0.0	6.4	1.6	0.0
	130	1	0	0	1	0	1	0.0	0.0	1.0	0.0
	135	1	0	0	1	0	1	0.0	0.0	1.0	0.0
	140	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	145	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	150	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	155	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	160	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	165	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	170	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	175	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	180	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	185	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	190	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	195	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	>200	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Totals		61	1	57	3	0	185	1.0	180.4	3.6	0.0
Grand Total		336	1	254	79	2	1381	1.0	1169.9	207.9	2.2

Table 10. Age-length distribution of French Creek wild coho smolts, by sample period, 1989. Age representation determined according to Ketchen's stratified subsampling method (Ricker 1975, p. 67).

Sample Period	Size-Class (mm)	Age Sample (X)	Age-groups in X				Length Sample (Y)	Calculated Age Representation in Y			
			0	1	2	3		0	1	2	3
Apr 17-May 10	<=80	9	0	9	0	0	9	0.0	9.0	0.0	0.0
	80	10	0	10	0	0	15	0.0	15.0	0.0	0.0
	85	11	0	11	0	0	32	0.0	32.0	0.0	0.0
	90	10	0	10	0	0	31	0.0	31.0	0.0	0.0
	95	10	0	9	1	0	45	0.0	40.5	4.5	0.0
	100	13	0	13	0	0	36	0.0	36.0	0.0	0.0
	105	11	0	10	1	0	29	0.0	26.4	2.6	0.0
	110	9	0	9	0	0	25	0.0	25.0	0.0	0.0
	115	7	0	5	2	0	17	0.0	12.1	4.9	0.0
	120	7	0	3	4	0	9	0.0	3.9	5.1	0.0
	125	9	0	6	3	0	19	0.0	12.7	6.3	0.0
	>130	4	0	2	2	0	6	0.0	3.0	3.0	0.0
Total		110	0	97	13	0	273	0.0	246.5	26.5	0.0
May 11-Jun 2	<=80	1	0	1	0	0	1	0.0	1.0	0.0	0.0
	80	3	0	3	0	0	6	0.0	6.0	0.0	0.0
	85	5	0	5	0	0	41	0.0	41.0	0.0	0.0
	90	10	0	10	0	0	78	0.0	78.0	0.0	0.0
	95	11	0	11	0	0	120	0.0	120.0	0.0	0.0
	100	8	0	8	0	0	102	0.0	102.0	0.0	0.0
	105	10	0	9	1	0	76	0.0	68.4	7.6	0.0
	110	9	0	8	1	0	27	0.0	24.0	3.0	0.0
	115	9	0	8	1	0	24	0.0	21.3	2.7	0.0
	120	2	0	1	1	0	6	0.0	3.0	3.0	0.0
	125	2	0	2	0	0	3	0.0	3.0	0.0	0.0
	>130	2	0	1	1	0	2	0.0	1.0	1.0	0.0
Total		72	0	67	5	0	486	0.0	468.7	17.3	0.0

Table 10 (cont). Age-length distribution of French Creek wild coho smolts, by sample period, 1989. Age representation determined according to Ketchen's stratified subsampling method (Ricker 1975, p. 67).

Sample Period	Size-Class (mm)	Age Sample (X)	Age-groups in X				Length Sample (Y)	Calculated Age Representation in Y			
			0	1	2	3		0	1	2	3
Jun 3-Jun 17	<=80	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	80	8	0	8	0	0	14	0.0	14.0	0.0	0.0
	85	9	0	9	0	0	29	0.0	29.0	0.0	0.0
	90	12	0	12	0	0	52	0.0	52.0	0.0	0.0
	95	10	0	10	0	0	58	0.0	58.0	0.0	0.0
	100	8	0	8	0	0	37	0.0	37.0	0.0	0.0
	105	11	0	10	1	0	15	0.0	13.6	1.4	0.0
	110	8	0	7	1	0	15	0.0	13.1	1.9	0.0
	115	6	0	4	2	0	6	0.0	4.0	2.0	0.0
	120	0	0	0	0	0	1	0.0	1.0	0.0	0.0
	125	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	>130	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Totals		72	0	68	4	0	227	0.0	221.8	5.2	0.0
Grand Total		254	0	232	22	0	986	0.0	937.0	49.0	0.0

Table 11. Age-length distribution of Trent River wild coho smolts, by sample period, 1989. Age representation determined according to Ketchen's stratified subsampling method (Ricker 1975, p. 67).

Sample Period	Size-Class (mm)	Age Sample (X)	Age-groups in X				Length Sample (Y)	Calculated Age Representation in Y			
			0	1	2	3		0	1	2	3
Apr 30-May 24	<=80	5	0	5	0	0	5	0.0	5.0	0.0	0.0
	80	25	0	25	0	0	26	0.0	26.0	0.0	0.0
	85	18	0	18	0	0	19	0.0	19.0	0.0	0.0
	90	19	0	19	0	0	23	0.0	23.0	0.0	0.0
	95	39	0	39	0	0	42	0.0	42.0	0.0	0.0
	100	32	0	31	1	0	34	0.0	32.9	1.1	0.0
	105	12	0	11	1	0	12	0.0	11.0	1.0	0.0
	110	14	0	13	1	0	16	0.0	14.9	1.1	0.0
	115	8	0	8	0	0	9	0.0	9.0	0.0	0.0
	120	4	0	2	2	0	6	0.0	3.0	3.0	0.0
	125	3	0	3	0	0	3	0.0	3.0	0.0	0.0
	>130	5	0	1	4	0	5	0.0	1.0	4.0	0.0
Total		184	0	175	9	0	200	0.0	189.8	10.2	0.0
May 25-Jun2	<=80	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	80	8	0	8	0	0	8	0.0	8.0	0.0	0.0
	85	21	0	21	0	0	22	0.0	22.0	0.0	0.0
	90	44	0	44	0	0	49	0.0	49.0	0.0	0.0
	95	51	0	51	0	0	58	0.0	58.0	0.0	0.0
	100	46	0	46	0	0	51	0.0	51.0	0.0	0.0
	105	19	0	19	0	0	24	0.0	24.0	0.0	0.0
	110	6	0	6	0	0	7	0.0	7.0	0.0	0.0
	115	3	0	3	0	0	5	0.0	5.0	0.0	0.0
	120	3	0	3	0	0	3	0.0	3.0	0.0	0.0
	125	0	0	0	0	0	0	0.0	0.0	0.0	0.0
	>130	0	0	0	0	0	2	0.0	0.0	2.0	0.0
Total		201	0	201	0	0	229	0.0	227.0	2.0	0.0
Grand Total		385	0	376	9	0	429	0.0	416.8	12.2	0.0

Table 12. Mean size, standard deviation, and sample size for Black Creek smolts, by size, age, and sample period, 1989. Total means and standard deviations are weighted across sample period and age strata.

Size	Age	Sample Period	Fork Length (mm)			Weight (g)		
			N	Mean	SD	N	Mean	SD
Small	0	Apr 13-May 10	-	-	-	-	-	-
		May 11-Jun 2	-	-	-	-	-	-
		Jun 3-Jun 23	1	75.0	0.0	1	5.5	0.0
		Total	1	75.0	0.0	1	5.5	0.0
	1	Apr 13-May 10	36	107.0	8.0	36	13.5	3.0
		May 11-Jun 2	61	105.3	9.3	61	11.9	3.1
		Jun 3-Jun 23	44	110.0	6.0	44	13.2	2.4
		Total	141	107.2	4.9	141	12.7	1.7
	2	Apr 13-May 10	15	111.5	4.7	15	14.8	1.6
		May 11-Jun 2	6	104.5	8.0	6	11.7	2.5
		Jun 3-Jun 23	-	-	-	-	-	-
		Total	21	109.5	4.1	21	13.9	1.4
	Total		163	107.3	4.3	163	12.8	1.5
Large	1	Apr 13-May 10	68	139.0	17.3	68	30.9	14.7
		May 11-Jun 2	28	129.0	7.0	28	21.3	3.6
		Jun 3-Jun 23	13	123.0	3.0	13	18.5	2.1
		Total	109	134.5	10.9	109	27.0	9.2
	2	Apr 13-May 10	44	170.9	24.6	44	56.1	26.9
		May 11-Jun 2	12	129.8	5.7	12	20.8	2.4
		Jun 3-Jun 23	2	129.5	4.9	2	20.0	2.6
		Total	58	161.0	18.7	58	47.5	20.4
	3	Apr 13-May 10	2	160.0	12.7	2	40.3	2.1
		May 11-Jun 2	-	-	-	-	-	-
		Jun 3-Jun 23	-	-	-	-	-	-
		Total	2	160.0	12.7	2	40.3	2.1
	Total		169	143.9	9.5	169	22.7	9.2
Total			332	125.9	5.3	332	17.9	4.7

Table 13. Mean size, standard deviation, and sample size for French Creek smolts, by origin, age and sample period, 1989. Total means and standard deviations are weighted across sample period and age strata.

Origin	Clip	Age	Sample Period	Fork Length (mm)			Weight (g)		
				N	Mean	SD	N	Mean	SD
Outplant	LV	2	Apr 17-May 10	43	146.0	15.0	43	29.8	8.5
			May 11-Jun 2	5	136.0	25.0	5	25.4	13.0
			Jun 3-Jun 17	1	110.0	0.0	1	12.8	0.0
			Total	48	145.0	13.7	48	29.3	7.7
	RV	1	Apr 17-May 10	159	114.0	7.0	159	14.7	2.8
			May 11-Jun 2	55	111.0	7.0	55	13.5	2.6
			Jun 3-Jun 17	1	102.0	0.0	1	9.7	0.0
			Total	215	113.2	5.5	215	14.4	2.2
	Total			263	119.0	5.1	263	17.1	2.3
Wild	-	1	Apr 17-May 10	97	100.6	15.1	97	11.3	5.2
			May 11-Jun 2	67	103.3	12.2	67	11.4	3.9
			Jun 3-Jun 17	68	99.6	12.0	68	9.9	3.8
			Total	232	101.1	8.0	232	10.9	2.7
	-	2	Apr 17-May 10	13	122.4	10.0	13	19.6	4.7
			May 11-Jun 2	5	119.0	9.8	5	17.3	4.8
			Jun 3-Jun 17	4	114.3	3.8	4	13.7	1.3
			Total	22	120.2	6.4	22	18.0	3.0
		Total		254	102.7	7.4	254	11.5	2.5
Total				517	111.0	4.5	517	14.4	1.7

Table 14. Mean size, standard deviation, and sample size for Trent River smolts, by origin, age, and sample period, 1989. Total means and standard deviations are weighted across sample period and age strata.

Origin	Clip	Age	Sample Period	Fork Length (cm)			Weight (g)		
				N	Mean	SD	N	Mean	SD
Outplant	LM	1	Apr 30-May 24	11	108.5	8.6	11	13.7	3.3
			May 25-Jun 17	8	107.6	9.8	8	12.5	3.2
			Total	19	108.1	6.5	19	13.2	2.4
	LV	1	Apr 30-May 24	19	105.4	9.6	19	9.5	5.1
			May 25-Jun 17	85	106.9	5.9	70	10.4	4.3
			Total	104	106.6	5.1	89	10.2	3.6
	RM	1	Apr 30-May 24	18	100.4	11.6	18	10.1	4.1
			May 25-Jun 17	59	97.7	7.3	45	8.1	3.4
			Total	77	98.3	6.2	63	8.7	2.7
	RV	1	Apr 30-May 24	65	103.9	8.9	65	10.7	4.7
			May 25-Jun 17	62	105.1	7.6	58	10.6	4.4
			Total	127	104.5	5.9	123	10.7	3.2
		Total		327	103.9	3.2	294	10.3	1.8
Wild	-	1	Apr 30-May 24	175	98.1	11.3	156	8.5	4.6
			May 25-Jun 17	201	98.6	7.8	164	8.4	3.8
			Total	376	98.4	6.7	320	8.5	3.0
	-	2	Apr 30-May 24	9	131.0	22.1	9	22.3	11.0
			May 25-Jun 17	-	-	-	-	-	-
			Total	9	131.0	22.1	9	22.3	11.0
		Total		385	99.1	6.6	329	8.8	2.9
Total				712	101.3	3.8	623	9.5	1.8

Table 15. Sex ratio and mean length of Black Creek, French Creek, and Trent River wild coho smolts, by sample period, 1989. Totals are the weighted mean length and standard deviation.

System	Sample Period	Sex	Proportion (%)	Sample Size	Mean Length (cm)	SD
Black Creek	Apr 13-May 10	Male	52.1	25	116.8	9.4
		Female	47.9	23	115.2	16.5
	May 11-Jun 2	Male	62.3	33	111.9	8.7
		Female	37.7	20	114.0	8.1
	Jun 3-Jun 23	Male	45.5	5	111.4	5.8
		Female	54.5	6	109.8	8.2
	Total	Male	53.3	63	113.8	5.9
		Female	46.7	49	114.0	8.5
French Creek	Apr 17-May 10	Male	64.3	9	92.1	11
		Female	35.7	5	95	11.9
	May 11-Jun 2	Male	40.7	22	97.5	11.3
		Female	59.3	32	95.6	8.9
	Jun 3-Jun 17	Male	43.5	20	91.5	6.8
		Female	56.5	26	89.7	6.3
	Total	Male	49.5	51	94.2	5.9
		Female	50.5	63	93.1	5.3
Trent River	Apr 30-May 24	Male	45.8	38	100.2	12.8
		Female	54.2	45	99.7	12.5
	May 25-Jun 17	Male	33.3	9	99.8	9.5
		Female	66.7	18	96.3	7.7
	Total	Male	39.6	47	100.1	10.5
		Female	60.4	63	98.7	9.2

Table 16. Tag retention rates for Black Creek, Fench Creek, and Trent River coho smolts coded wire tagged in 1989

System	Date	Time Held	Sample Size	No. tags Lost	Percent Retention
Black Creek	Apr-18	48	100	1	99.0
	Apr-20	48	100	1	99.0
	Apr-29	48	100	2	98.0
	May-01	48	100	0	100.0
	May-05	48	100	1	99.0
	May-19	48	100	1	99.0
	Total	48	600	6	99.0
French Creek	May-14	48	100	0	100.0
	May-20	48	100	1	99.0
	Total	48	200	1	99.5
Trent River	May-09	48	100	1	99.0

Table 17. Coded wire tag releases of coho smolts from Black Creek, French Creek, and the Trent River, 1989 (not corrected for tag loss).

System	Size/ Origin	Tag Code	Tagging Period	No. Marked	Tagging Mortalities	Total Tags Released	Total Released Untagged (1)
Black Creek	small	8/26/15	Apr-13 - Apr-19	13	2	11	0
		8/26/45	Apr-20 - Apr-30	733	2	731	3
		8/25/14	May-01 - May-10	2145	7	2138	10
		8/26/31	May-11 - May-15	2871	6	2865	10
		8/16/11	May-16 - May-19	1506	0	1506	36
		8/16/10	May-20 - Jun-02	10946	6	10940	77
		8/16/06	Jun-03 - Jun-23	1384	0	1384	49
	Total			19598	23	19575	185
	large	8/26/46	Apr-13 - Apr-19	163	2	161	0
		8/25/16	Apr-20 - Apr-30	2799	1	2798	10
		8/16/09	May-01 - May-10	3185	1	3184	14
		8/26/39	May-11 - May-15	805	0	805	3
		8/26/17	May-16 - May-19	455	2	453	12
		8/26/18	May-20 - Jun-02	1896	0	1896	10
		8/26/20	May-20 - Jun-02	366	0	366	6
		8/26/38	Jun-03 - Jun-23	238	0	238	10
	Total			9907	6	9901	65
Total				29505	29	29476	250
French Creek	wild	8/26/43	Apr-17 - May-10	1756	2	1754	19
		8/25/11	May-11 - May-19	3987	8	3979	38
		8/25/13	May-20 - Jun-02	5252	8	5244	13
		8/26/44	Jun-03 - Jun-17	450	1	449	4
	Total			11445	19	11426	74
	outplanted	8/26/42	Apr-17 - Jun-17	751	4	747	8
Total				12196	23	12173	82
Trent River	wild	8/25/05	Apr-30 - May-24	1556	1	1555	25
		8/26/41	May-25 - Jun-17	1909	3	1906	35
	Total			3465	4	3461	60
	outplanted	8/26/40	Apr-30 - May-24	3501	4	3497	50
		8/26/23	Apr-30 - May-24	2231	9	2222	35
		8/25/07	May-25 - Jun-17	3145	4	3141	57
	Total			8877	17	8860	142
Total				12342	21	12321	202

(1) Escapees from Tables 4, 5, and 6, apportioned between larges and smalls and wild and outplanted.

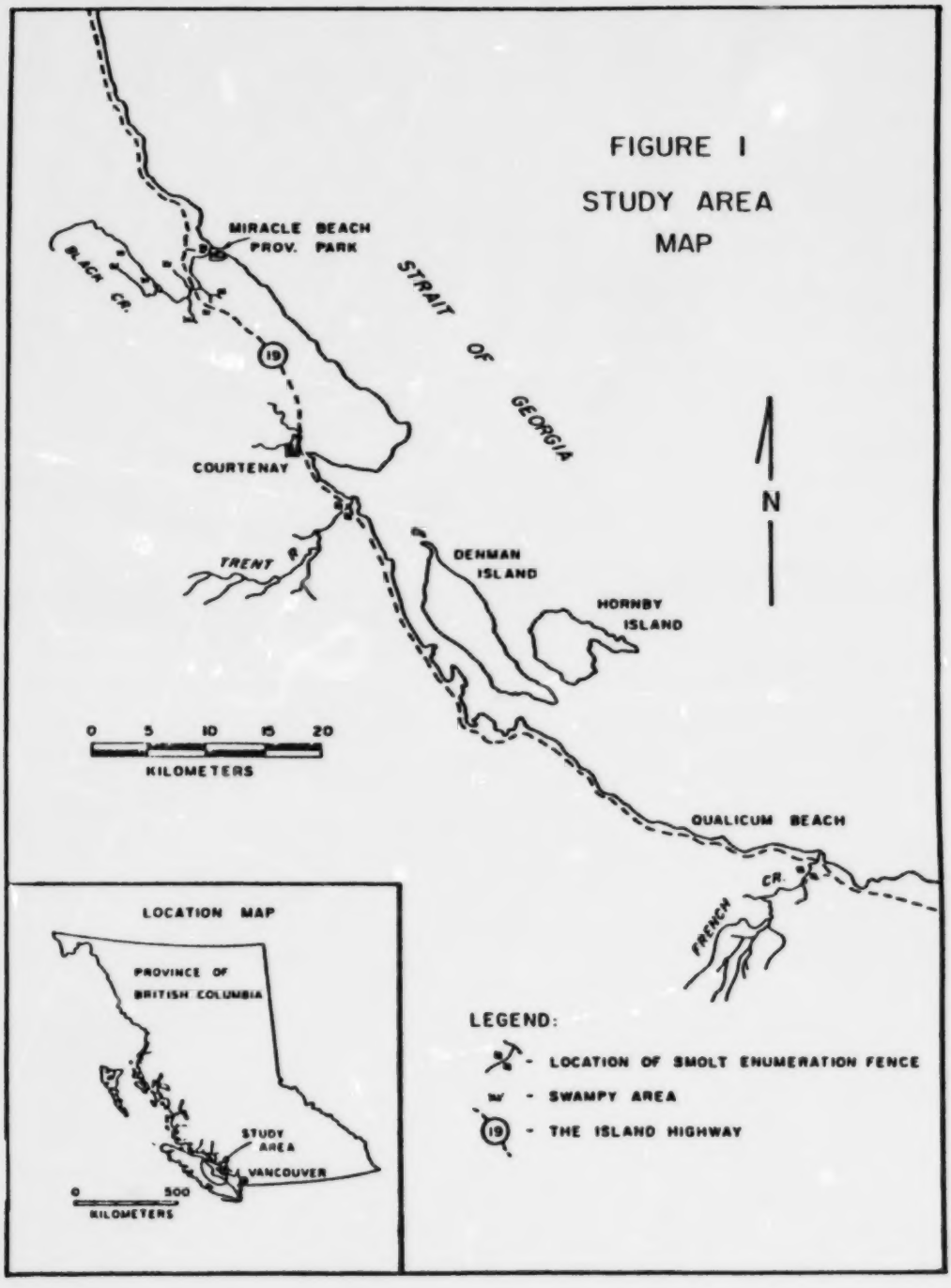


Figure 1. Study area map

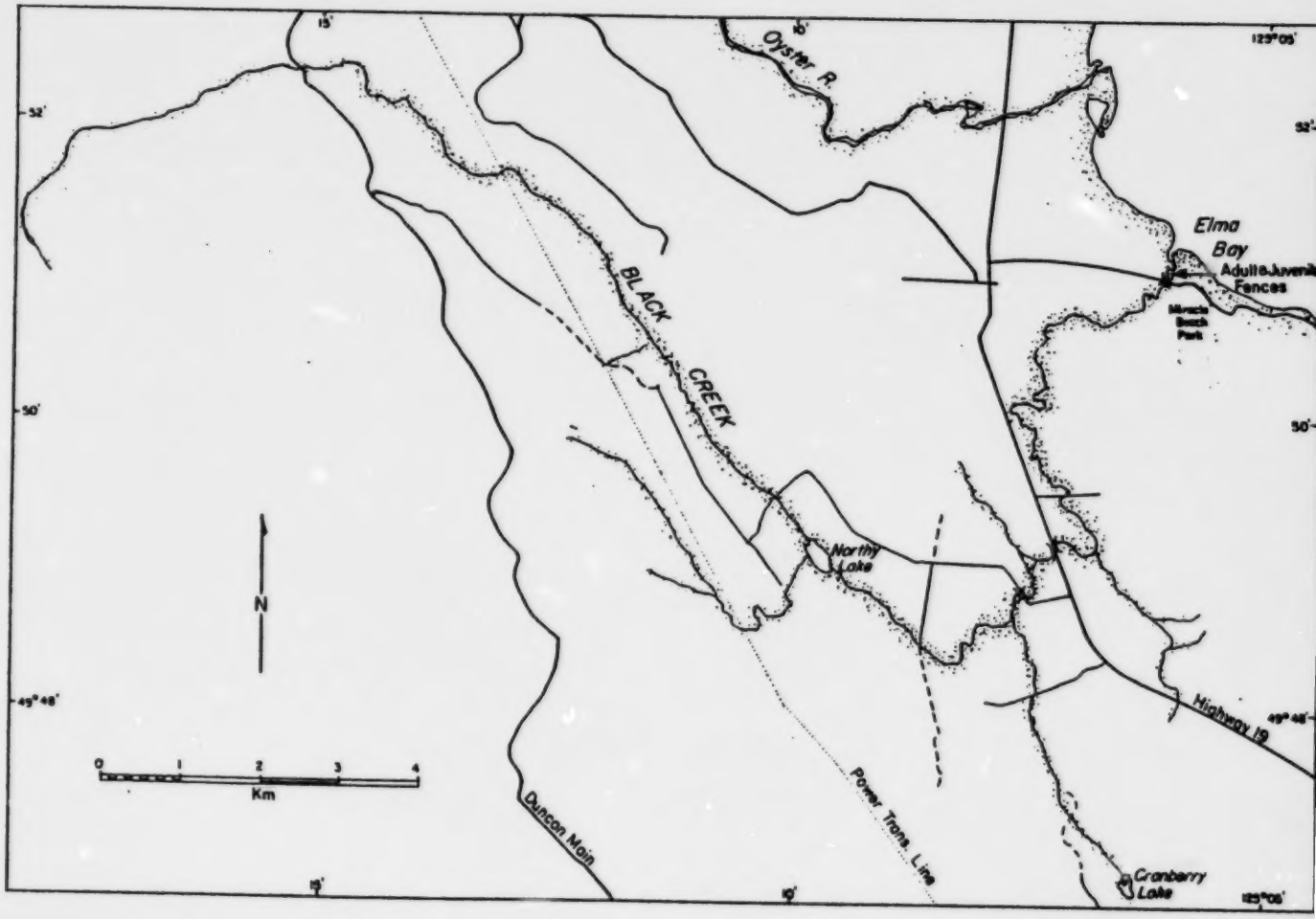


Figure 2. Map of Black Creek showing location of counting fence used to capture juvenile salmon.

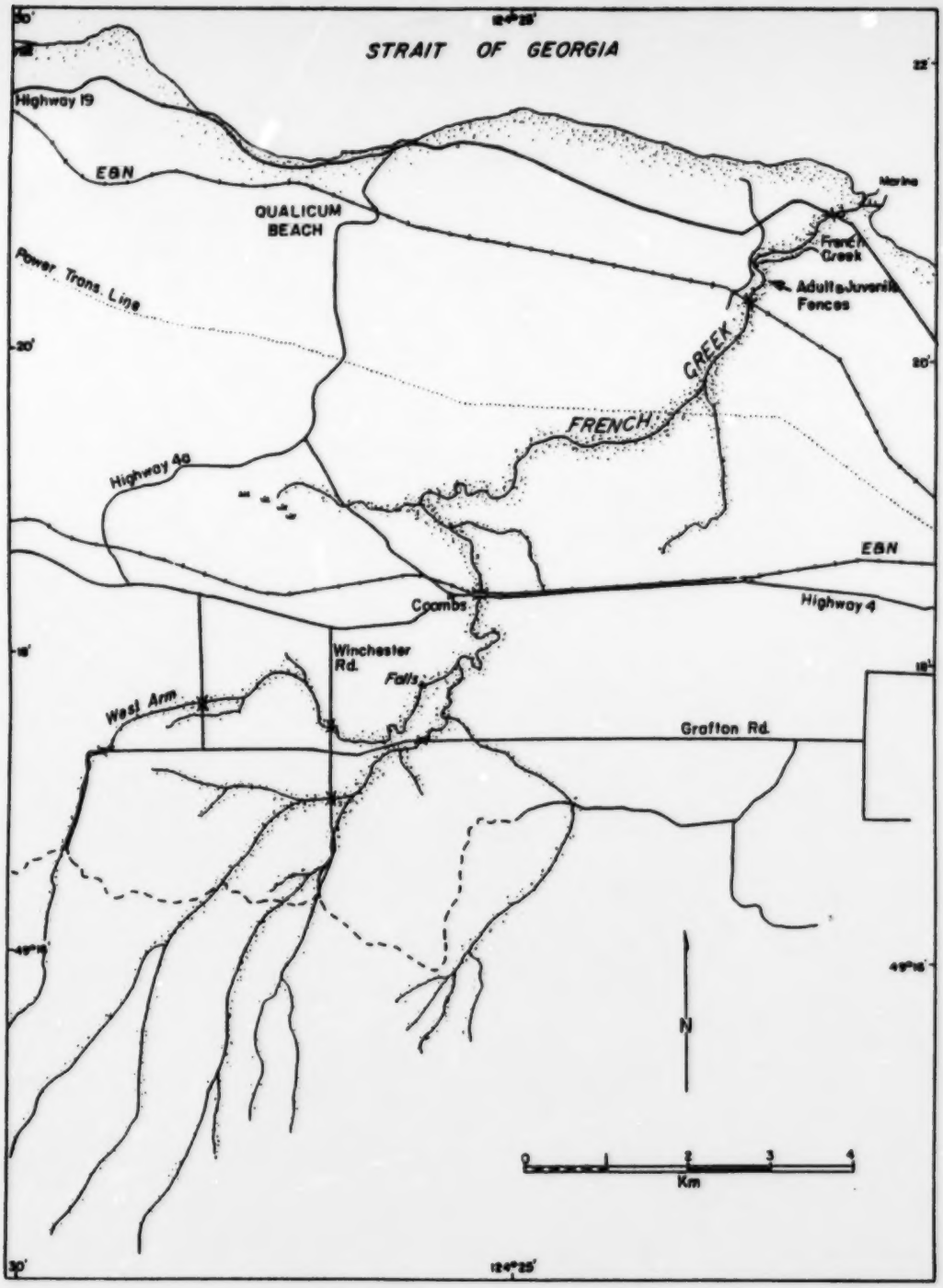


Figure 3. Map of French Creek showing location of counting fence used to capture juvenile salmon.

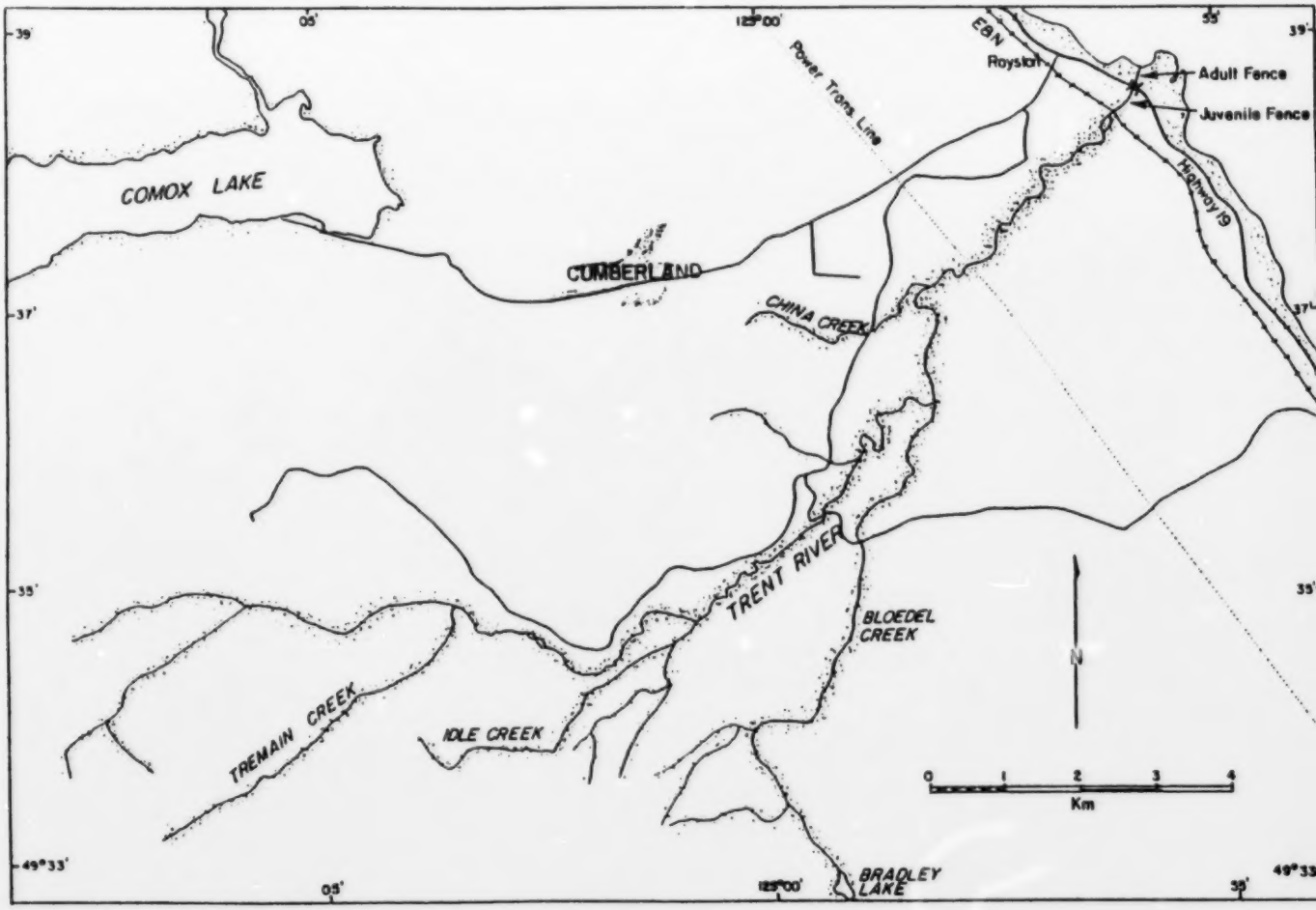


Figure 4. Map of the Trent River showing location of counting fence used to capture juvenile salmon.

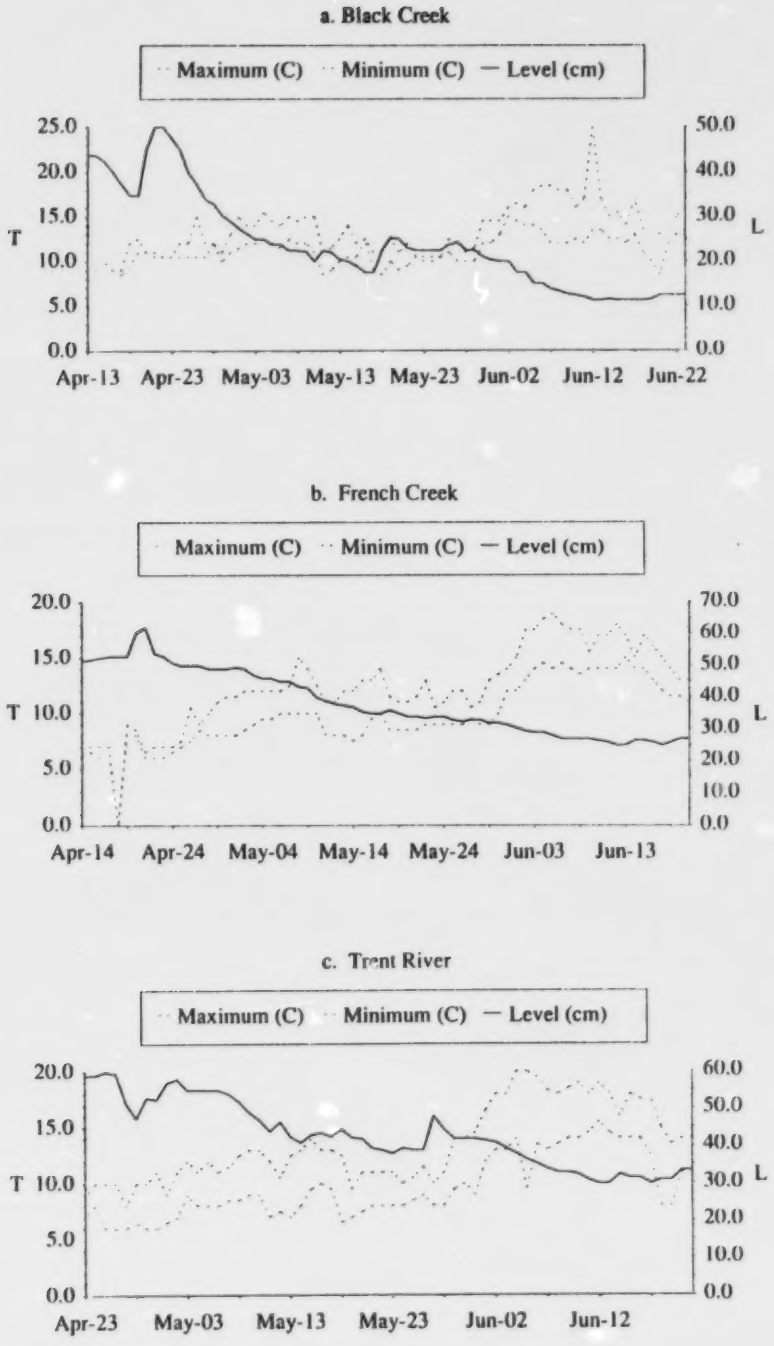
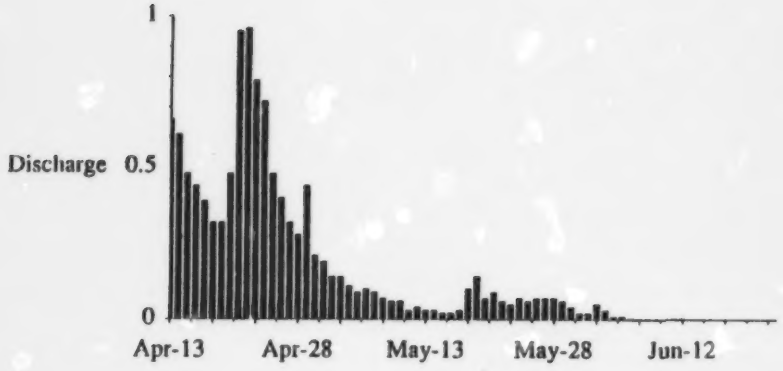
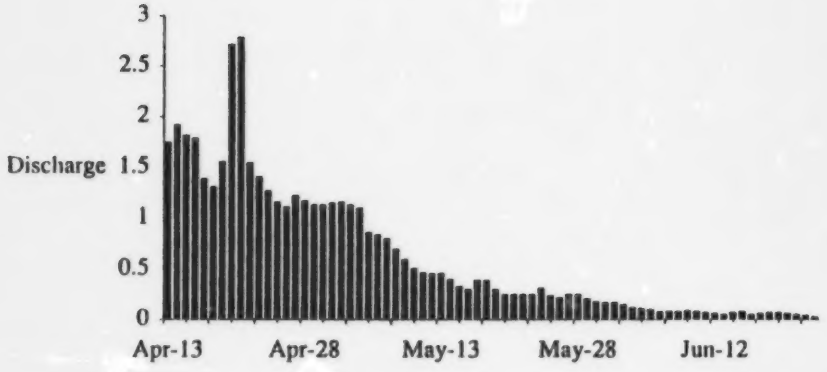


Figure 5. Water temperatures and levels for Black Creek, French Creek, and the Trent River, April - June, 1989.

a. Black Creek



b. French Creek



c. Trent River

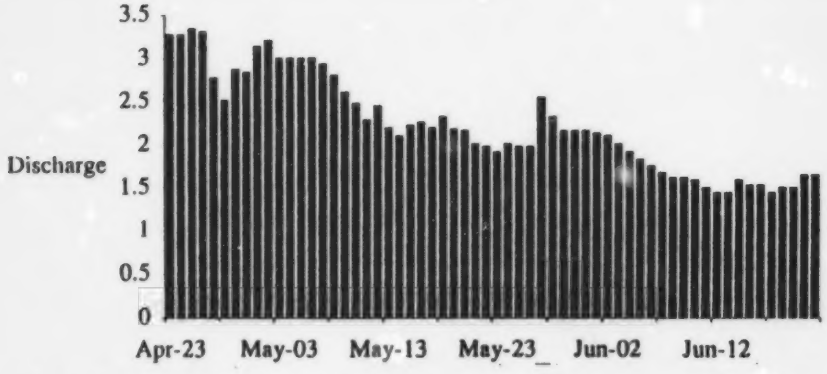


Figure 6. Daily discharge (m^3s^{-1}) at Black Creek, French Creek, and the Trent River, April - June, 1989.

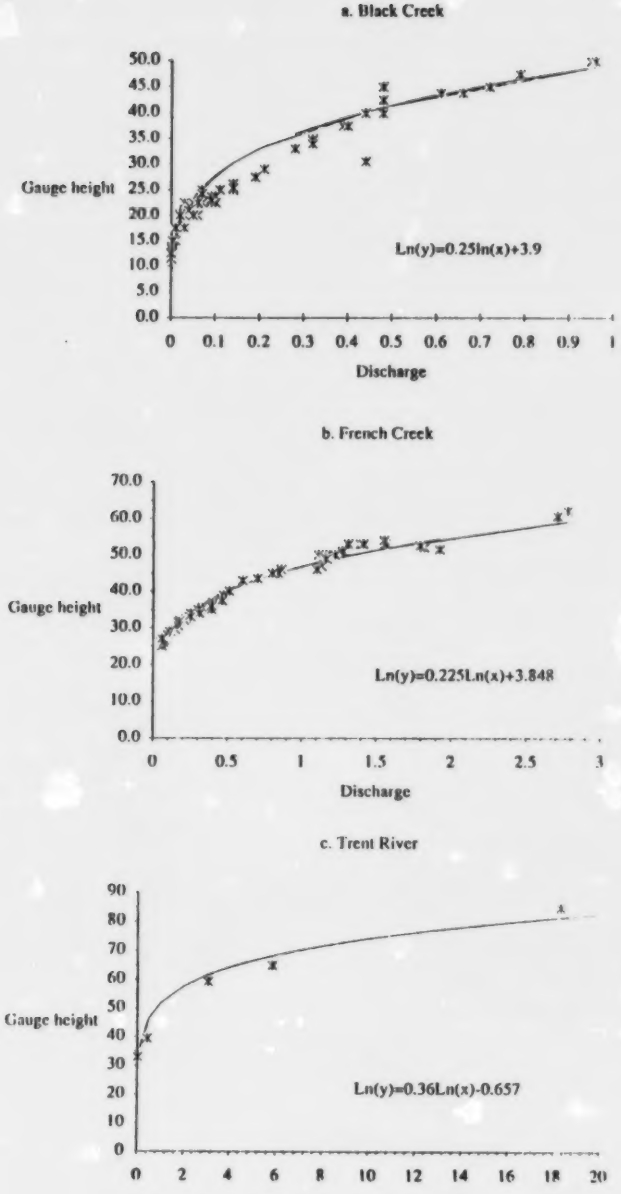


Figure 7. Stage-discharge relations for Black Creek, French Creek, and the Trent River, 1989. Discharge is in m^3s^{-1} and gauge height is in centimetres.

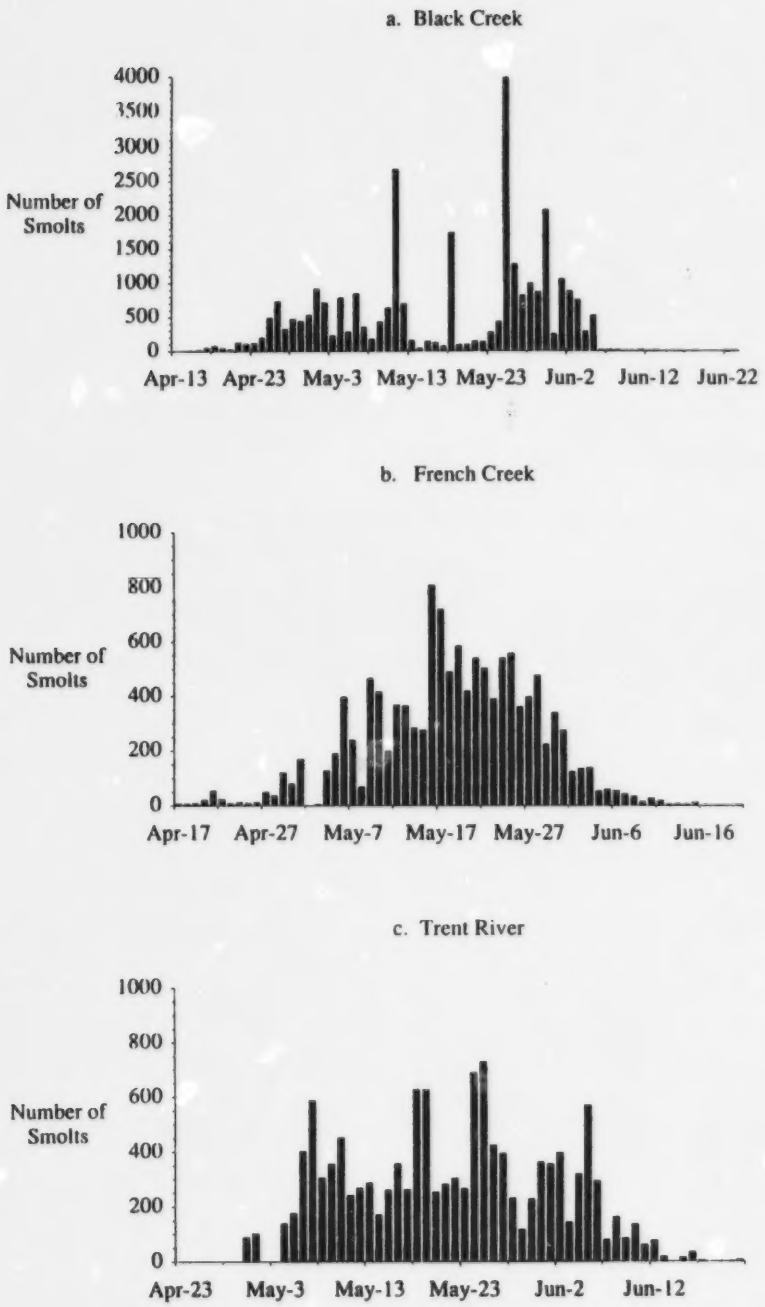


Figure 8. Total coho smolt catches at Black Creek, French Creek, and the Trent River, 1989.

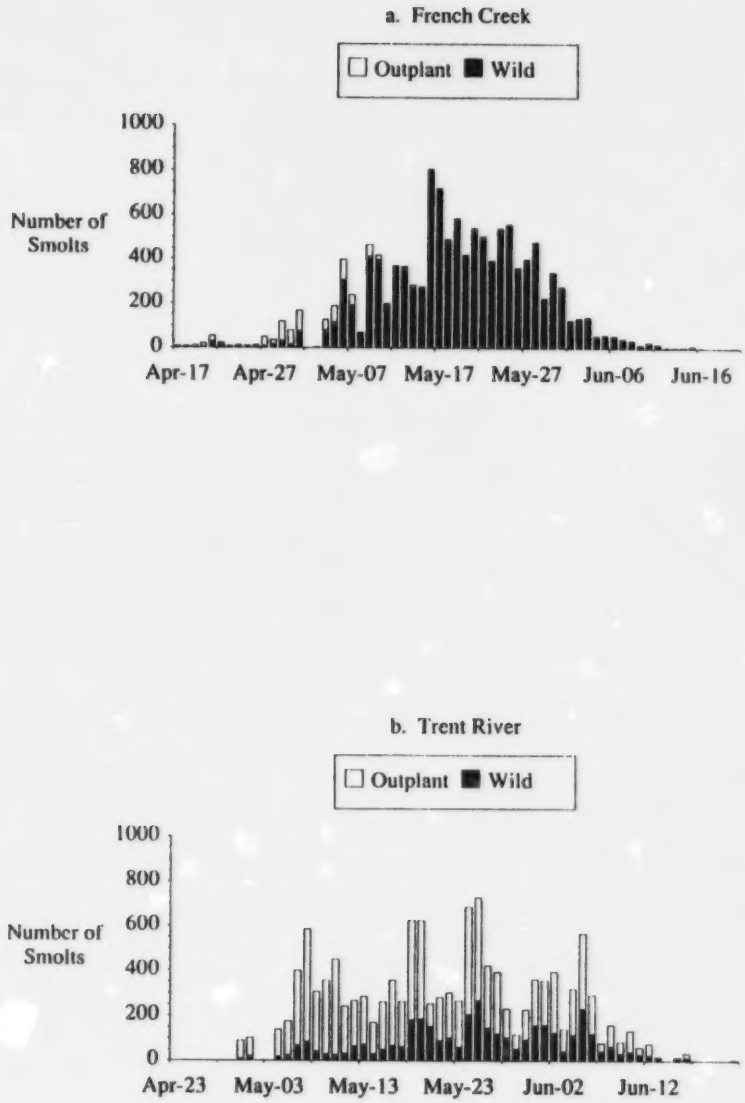


Figure 9. Wild and outplanted coho smolt catches at French Creek and the Trent River, 1989

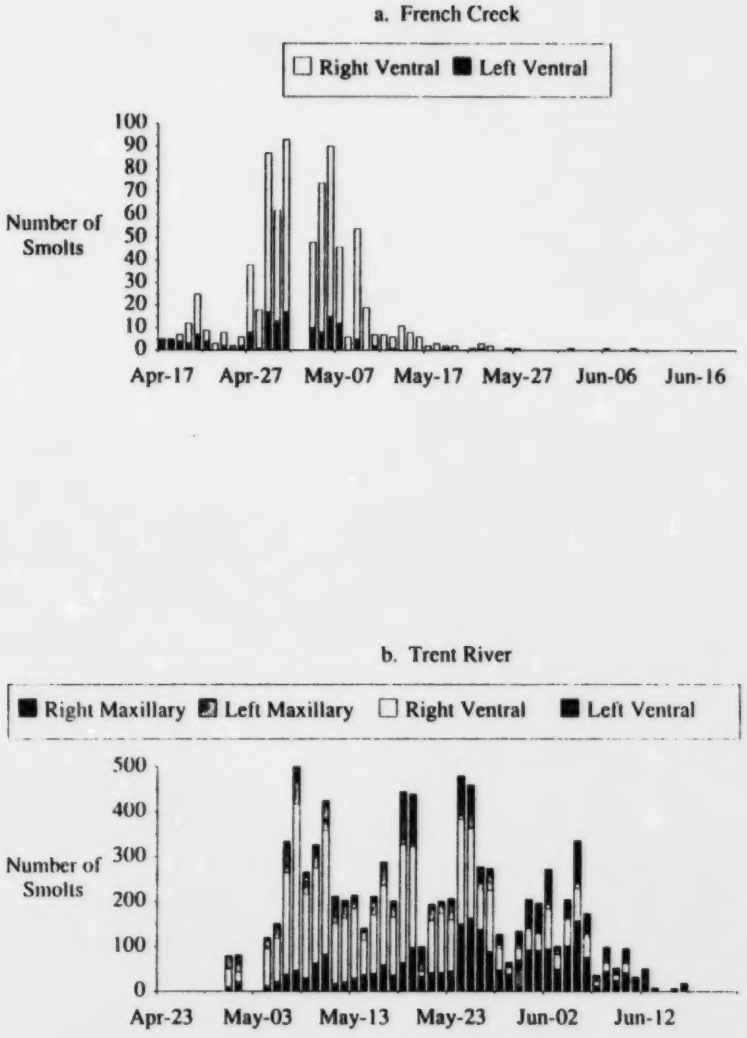


Figure 10. Outplanted coho smolt catches at French Creek and the Trent River, 1989.

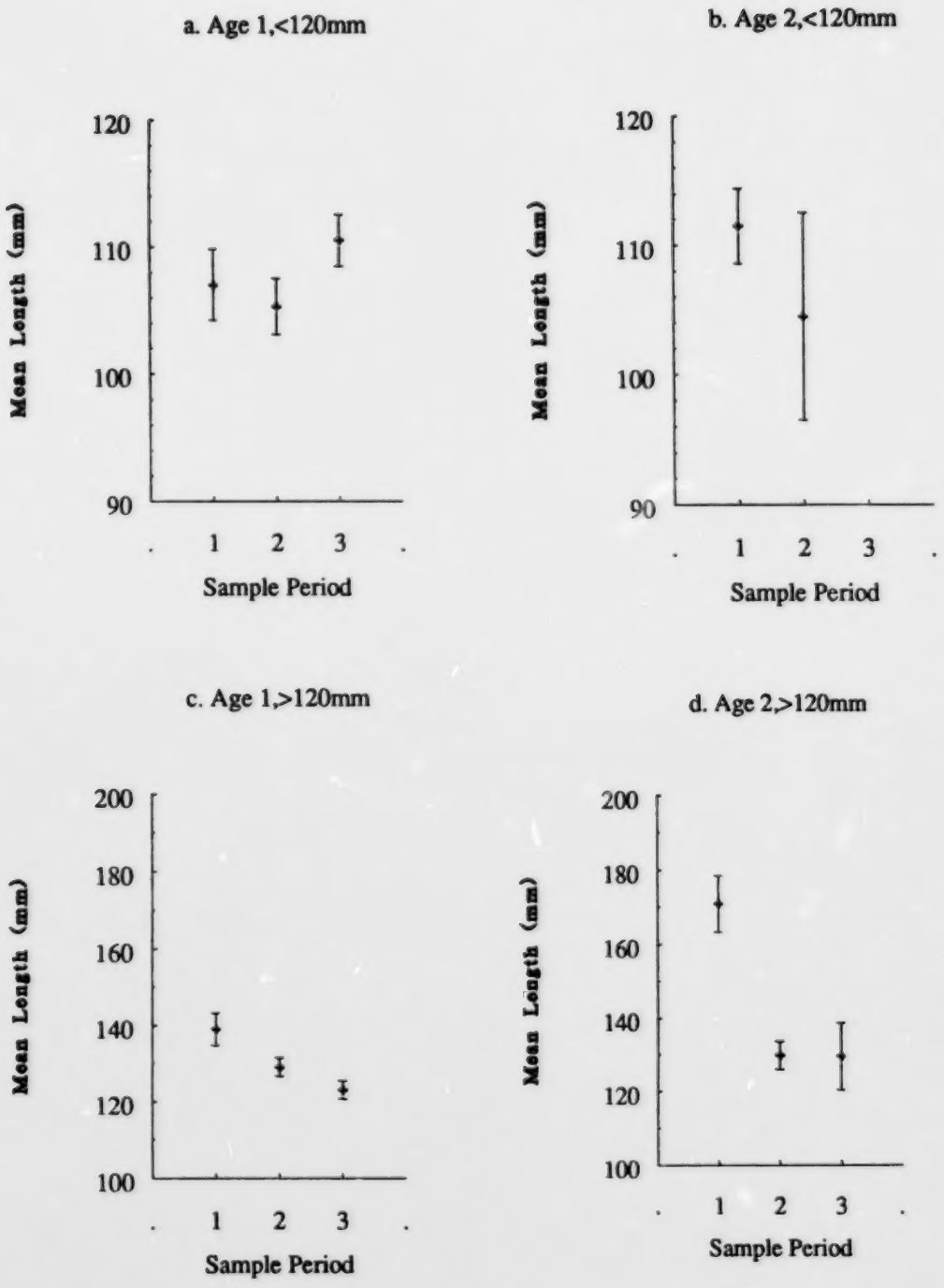


Figure 11. Mean fork-length of Black Creek coho smolts, by size, age and sampling period, 1989. Error bars are 95% confidence limits.

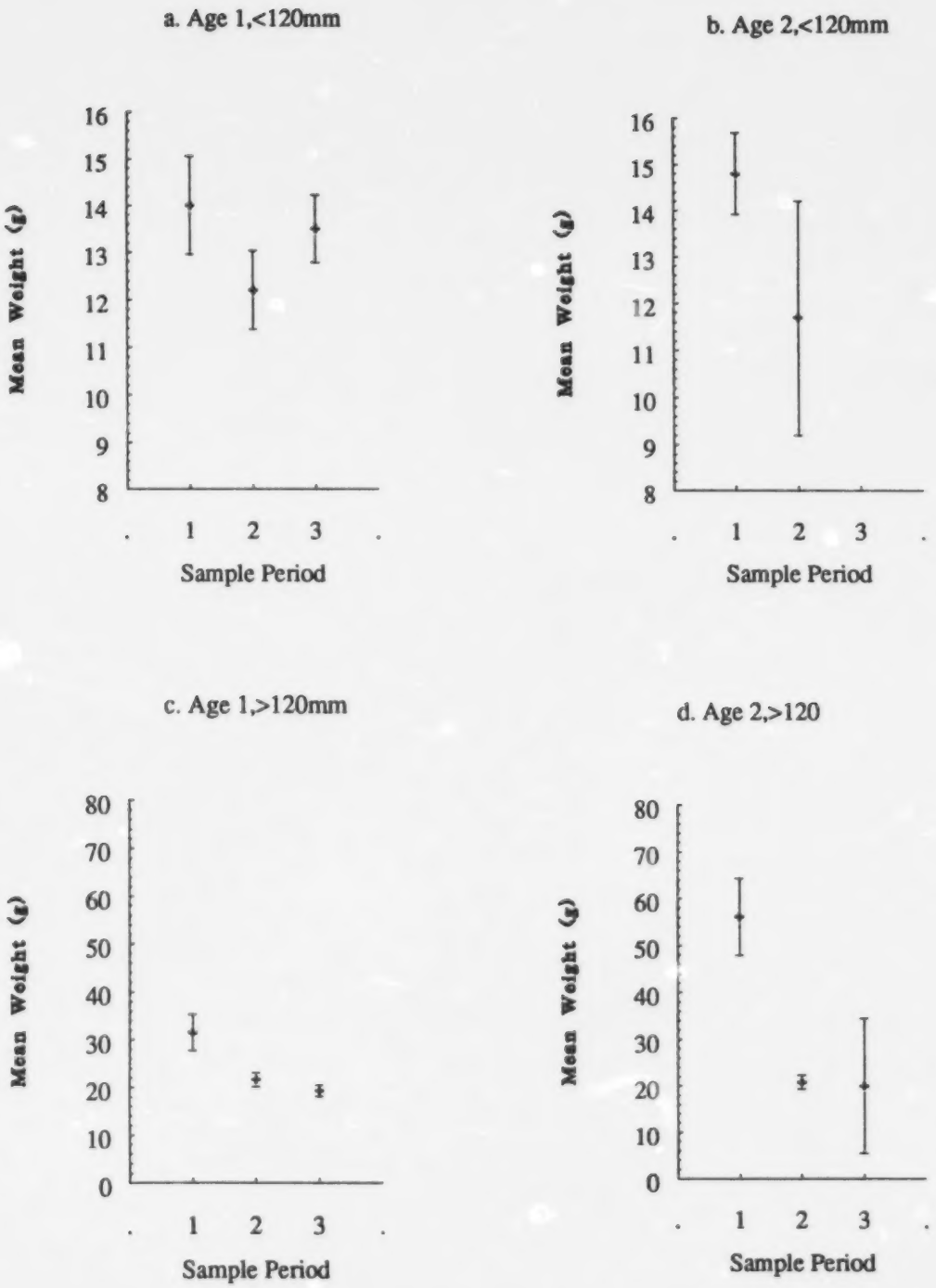


Figure 12. Mean weight of Black Creek coho smolts, by size, age and sampling period, 1989. Error bars are 95% confidence limits.

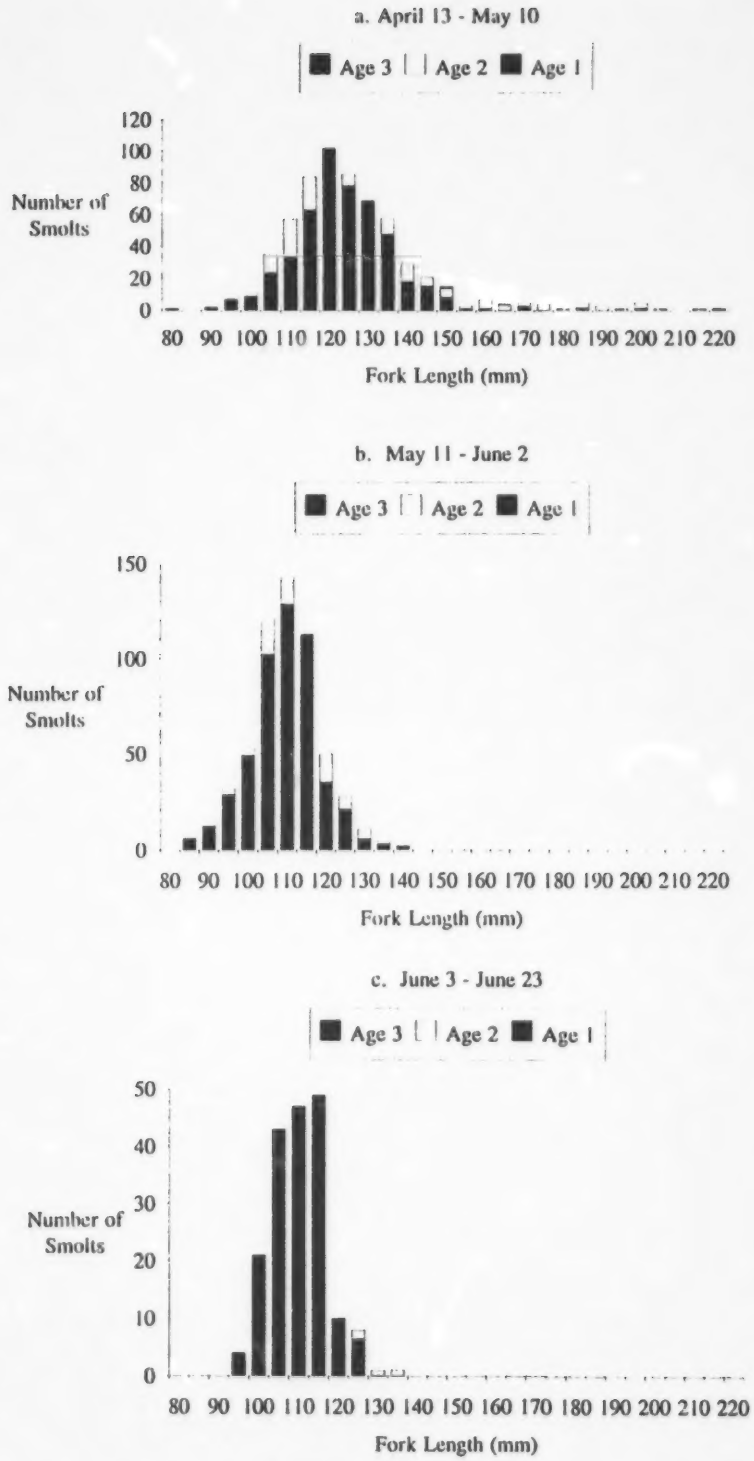


Figure 13. Length frequency distributions of Black Creek coho smolts by timing period, 1989.

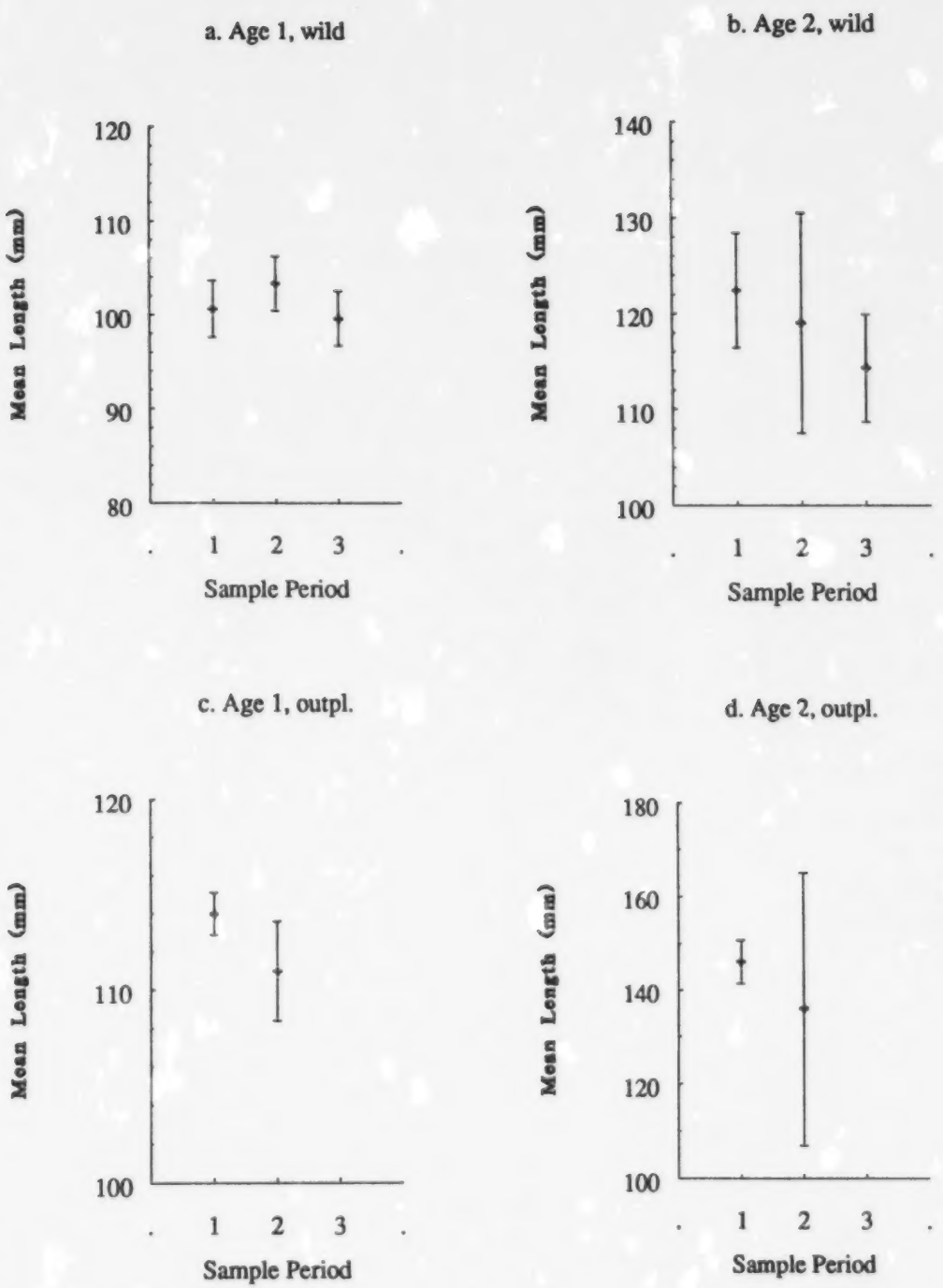


Figure 14. Mean fork-length of French Creek coho smolts, by size, age and sampling period, 1989. Error bars are 95% confidence limits.

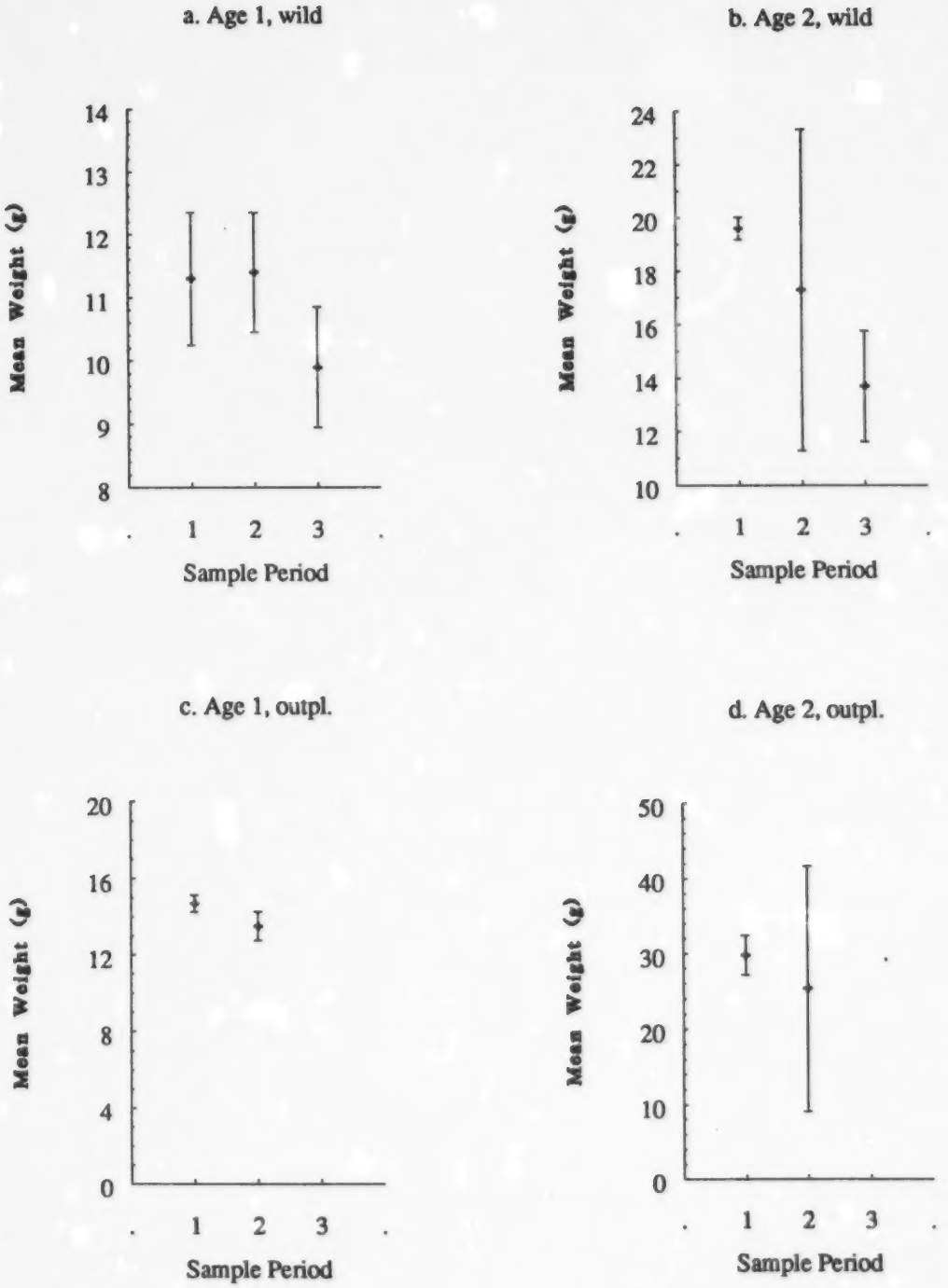


Figure 15. Mean weight of French Creek coho smolts, by size, age and sampling period, 1989. Error bars are 95% confidence limits.

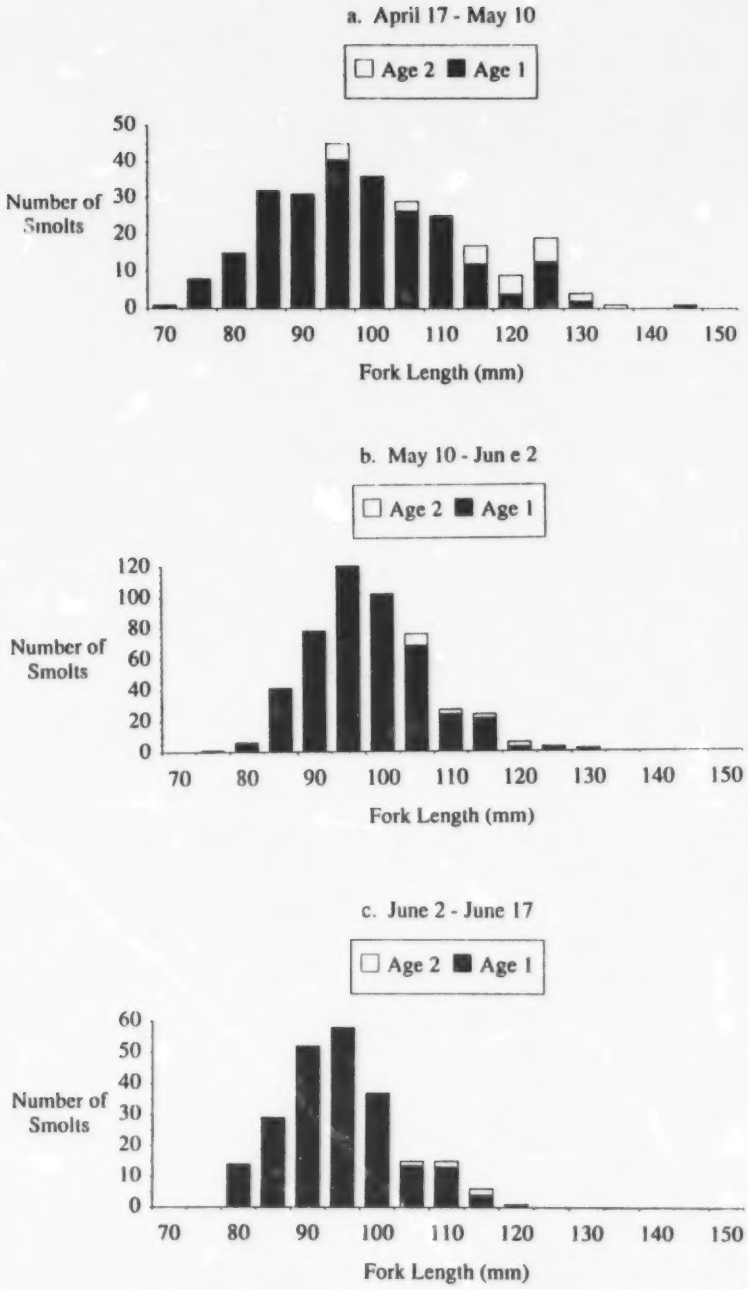
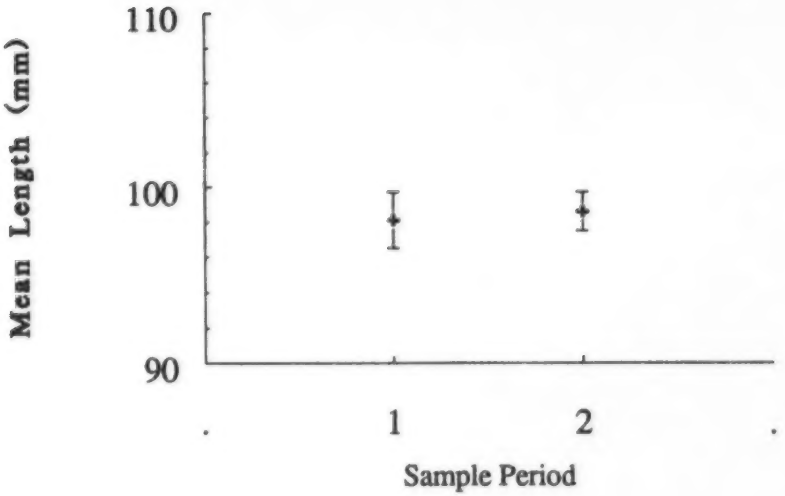


Figure 16. Length frequency distributions of French Creek coho smolts by timing period, 1989.

a. Age 1, wild



a. Age 2, wild

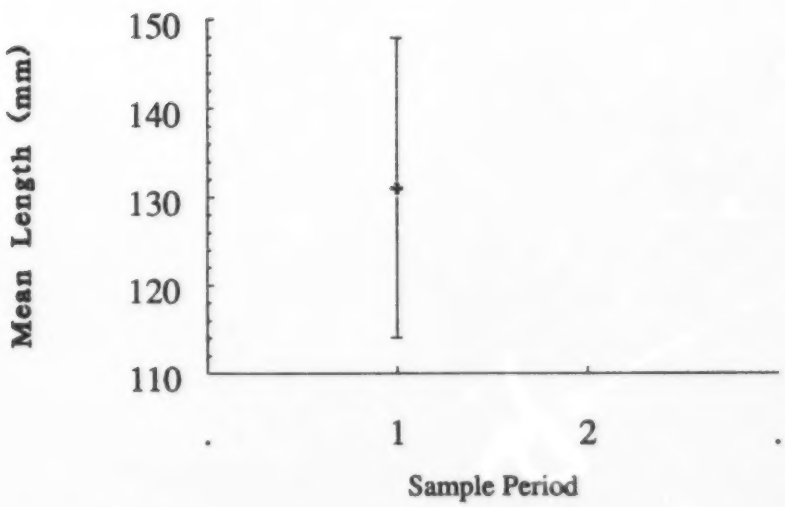
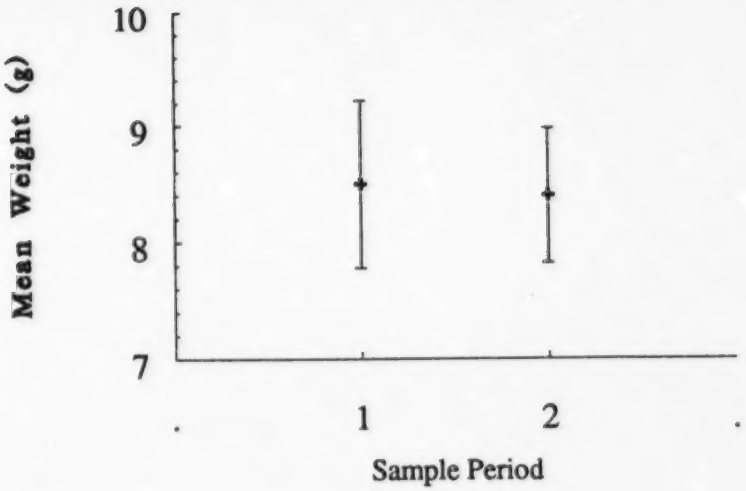


Figure 17. Mean fork-length of Trent River coho smolts, by size, age and sampling period, 1989. Error bars are 95% confidence limits.

a. Age 1, wild



a. Age 2, wild

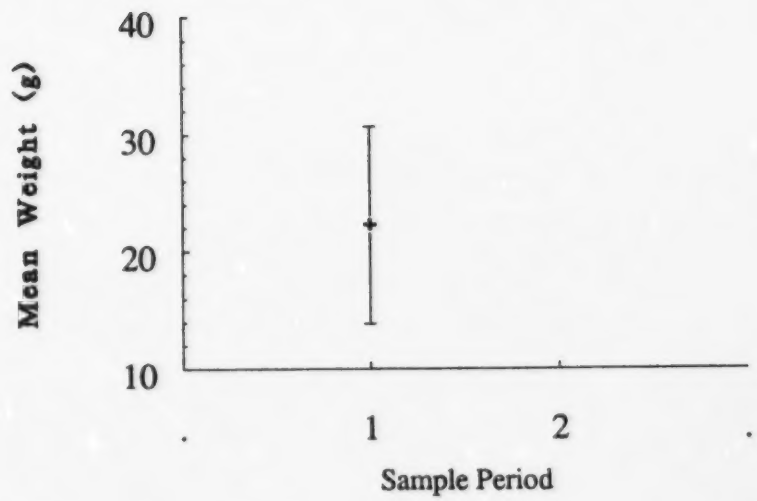


Figure 18. Mean weight of Trent River coho smolts, by size, age and sampling period, 1989. Error bars are 95% confidence limits.

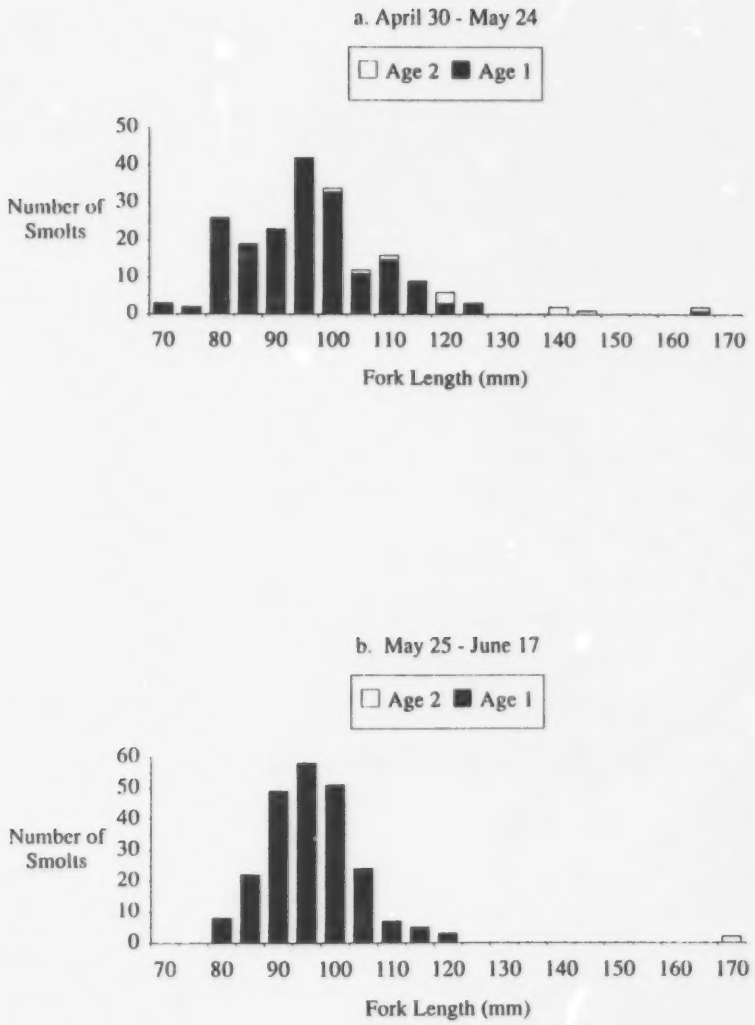


Figure 19. Length frequency distributions of Trent River coho smolts by sampling period, 1989.

APPENDIX A

Biophysical data for Black Creek, French Creek, and the Trent River, 1989.

Appendix A. Biophysical data for Black Creek, French Creek and Trent River, 1989. For all systems, gauge 1 is upstream of gauge 2.

System	Date	Period	Time	Temperature (c)			Water Level (cm)		Rain	Wind direction	Wind speed (km/hr)	Cloud cover (%)
				Maximum	Minimum	Present	Gauge 1	Gauge 2				
BLACK	4/13/89	1	830	10.0	9.0	9.0	72.5	43.8	0	0	0	0
BLACK	4/14/89	1	830	10.0	9.0	9.0	72.5	43.8	1	NW	5	80
BLACK	4/15/89	1	900	10.0	9.0	9.0	75.0	42.5	0	NW	5	0
BLACK	4/16/89	1	800	9.0	9.0	9.0	77.5	40.0	0	NW	5	5
BLACK	4/17/89	1	900	9.0	8.5	9.0	77.5	37.5	0	0	0	0
BLACK	4/18/89	1	830	12.0	9.5	9.5	77.5	35.0	0	0	0	50
BLACK	4/19/89	1	830	12.5	11.0	11.5	77.5	34.8	2	0	0	100
BLACK	4/20/89	2	830	11.0	11.0	11.0	85.0	45.0	4	0	0	100
BLACK	4/21/89	2	830	11.0	10.5	10.5	92.5	50.0	0	SE	15	80
BLACK	4/22/89	2	830	10.5	10.5	10.5	92.5	50.0	0	0	0	50
BLACK	4/23/89	2	830	10.5	10.5	10.5	93.8	47.5	0	SE	10	60
BLACK	4/24/89	2	900	12.0	10.5	12.0	95.0	45.0	0	NW	5	0
BLACK	4/25/89	2	900	12.0	10.5	10.5	93.8	40.0	0	NW	5	0
BLACK	4/26/89	2	900	15.0	10.5	10.5	90.0	37.5	0	0	0	90
BLACK	4/27/89	2	830	12.0	10.5	11.0	87.5	34.0	0	0	0	90
BLACK	4/28/89	2	830	12.0	12.0	12.0	84.0	33.0	0	NW	5	0
BLACK	4/29/89	2	830	11.0	10.0	10.0	83.0	30.5	0	NW	5	0
BLACK	4/30/89	2	830	13.0	11.0	11.0	81.0	29.0	0	NW	2	0
BLACK	5/1/89	3	800	15.0	11.5	11.5	77.5	27.5	0	0	0	5
BLACK	5/2/89	3	830	14.0	12.0	12.0	72.5	26.2	0	0	0	100
BLACK	5/3/89	3	830	14.0	12.0	12.0	71.0	25.0	0	SE	5	85
BLACK	5/4/89	3	800	15.5	12.5	12.5	75.0	25.0	0	0	0	5
BLACK	5/5/89	3	830	14.5	12.0	12.5	72.5	23.8	2	0	0	100
BLACK	5/6/89	3	800	14.0	11.5	11.5	70.0	23.8	0	0	0	100
BLACK	5/7/89	3	800	15.0	12.5	13.0	67.5	22.5	0	0	0	5
BLACK	5/8/89	3	830	14.5	12.0	12.0	64.8	22.5	0	NW	5	0
BLACK	5/9/89	3	830	15.0	12.0	12.0	64.8	22.3	0	0	0	10
BLACK	5/10/89	3	800	15.0	11.0	11.0	60.0	20.0	0	0	0	10
BLACK	5/11/89	4	830	11.0	8.5	8.5	62.5	22.5	0	NW	5	5
BLACK	5/12/89	4	830	11.5	9.0	11.0	61.0	22.0	0	0	0	80
BLACK	5/13/89	4	830	12.5	10.0	11.0	57.3	20.5	0	0	0	0
BLACK	5/14/89	4	800	14.0	10.5	11.0	55.0	20.0	0	0	0	0
BLACK	5/15/89	4	830	12.0	10.5	10.5	52.5	19.0	0	NW	5	50
BLACK	5/16/89	5	830	12.5	12.5	12.5	50.0	17.5	0	SE	5	100
BLACK	5/17/89	5	830	11.0	9.0	9.0	50.0	17.5	2	NW	5	100
BLACK	5/18/89	5	850	11.0	8.5	8.5	60.0	22.5	0	0	0	90
BLACK	5/19/89	5	830	12.5	10.0	10.0	63.5	25.4	0	NW	2	5

Appendix A. Biophysical data for Black Creek, French Creek and Trent River, 1989. For all systems, gauge 1 is upstream of gauge 2.

System	Date	Period	Time	Temperature (c)			Water Level (cm)		Rain	Wind direction	Wind speed (km/hr)	Cloud cover (%)
				Maximum	Minimum	Present	Gauge 1	Gauge 2				
BLACK	5/20/89	6	830	11.0	9.0	9.0	61.0	25.0	0	NW	2	65
BLACK	5/21/89	6	830	12.0	9.5	9.5	60.5	23.0	0	0	0	75
BLACK	5/22/89	6	800	10.5	10.5	10.5	60.0	22.5	0	0	0	90
BLACK	5/23/89	6	800	10.5	10.0	10.0	60.0	22.5	3	0	0	100
BLACK	5/24/89	6	800	10.5	10.0	10.0	60.0	22.5	0	NW	10	80
BLACK	5/25/89	6	800	10.5	10.5	10.5	60.0	22.5	0	0	0	40
BLACK	5/26/89	6	830	12.5	11.0	11.0	58.5	23.8	1	SE	5	100
BLACK	5/27/89	6	830	12.0	10.0	10.0	61.0	24.3	1	SE	5	100
BLACK	5/28/89	6	830	11.0	10.0	10.0	60.0	22.5	0	0	0	10
BLACK	5/29/89	6	830	11.5	10.0	11.5	60.0	22.5	0	0	0	100
BLACK	5/30/89	6	830	14.5	12.0	12.0	56.5	21.0	0	0	0	90
BLACK	5/31/89	6	830	14.5	12.0	12.0	55.5	20.3	0	NW	5	20
BLACK	6/1/89	6	830	14.5	13.0	14.0	55.0	20.0	0	NW	10	0
BLACK	6/2/89	6	830	16.0	15.0	14.0	57.5	20.0	0	NW	15	10
BLACK	6/3/89	7	830	16.5	14.5	14.5	52.0	17.5	0	0	0	5
BLACK	6/4/89	7	800	16.0	14.0	14.5	52.0	17.5	0	0	0	5
BLACK	6/5/89	7	800	18.0	14.0	15.0	50.0	15.0	0	NW	20	0
BLACK	6/6/89	7	800	18.5	13.5	13.5	47.5	15.0	0	NW	10	0
BLACK	6/7/89	7	800	18.5	12.0	12.0	46.3	13.8	0	NW	5	0
BLACK	6/8/89	7	830	18.0	12.0	12.0	48.8	13.3	2	NW	5	100
BLACK	6/9/89	7	830	18.0	12.0	12.0	47.5	12.7	0	NW	5	5
BLACK	6/10/89	7	830	16.0	12.5	12.5	45.0	12.4	0	NW	5	5
BLACK	6/11/89	7	800	17.0	12.0	12.0	45.0	12.0	0	NW	5	0
BLACK	6/12/89	7	800	25.0	13.5	13.5	43.8	11.3	0	0	0	90
BLACK	6/13/89	7	800	17.0	13.5	13.5	42.5	11.3	1	0	0	100
BLACK	6/14/89	7	830	15.0	12.5	13.0	43.0	11.5	0	SE	5	5
BLACK	6/15/89	7	830	15.5	12.5	12.5	43.0	11.3	0	0	0	75
BLACK	6/16/89	7	800	14.0	12.0	12.0	42.5	11.3	0	0	0	0
BLACK	6/17/89	7	800	17.0	13.0	13.0	42.5	11.3	4	0	0	100
BLACK	6/18/89	7	800	13.5	11.0	11.0	42.5	11.3	0	SE	10	20
BLACK	6/19/89	7	830	13.0	10.0	10.0	42.3	11.5	0	0	0	65
BLACK	6/20/89	7	830	13.0	8.5	8.5	45.0	12.5	0	0	0	15
BLACK	6/21/89	7	830	13.5	12.0	13.0	45.0	12.5	2	0	0	90
BLACK	6/22/89	7	900	15.0	13.0	13.0	45.0	12.5	0	NW	10	10
BLACK	6/23/89	7	830	16.0	13.5	13.5	45.0	12.5	0	SW	3	10

Appendix A. Biophysical data for Black Creek, French Creek and Trent River, 1989. For all systems, gauge 1 is upstream of gauge 2.

System	Date	Period	Time	Temperature (c)			Water Level (cm)		Rain	Wind direction	Wind speed (km/hr)	Cloud cover (%)
				Maximum	Minimum	Present	Gauge 1	Gauge 2				
FRENCH	4/14/89	1	840	7.0	6.5	7.0	33.5	51.5	0	NW	5	10
FRENCH	4/15/89	1	900	7.0	6.5	7.0	33.5	52.0	0	0	0	0
FRENCH	4/16/89	1	900	7.0	6.0	7.0	33.5	52.5	0	0	0	0
FRENCH	4/17/89	1	945	7.0	6.0	7.0	33.5	53.0	0	NW	5	0
FRENCH	4/18/89	1	0	0.0	0.0	0.0	34.0	53.0	0	0	0	0
FRENCH	4/19/89	1	900	9.0	8.0	9.0	35.0	53.0	0	SE	10	80
FRENCH	4/20/89	1	1015	8.5	8.0	8.5	41.5	60.5	3	SE	5	100
FRENCH	4/21/89	1	930	6.5	6.0	6.0	43.0	62.0	0	SE	15	80
FRENCH	4/22/89	1	930	7.0	6.0	6.5	38.5	54.0	0	SE	10	90
FRENCH	4/23/89	1	900	7.0	6.0	6.0	36.0	53.0	0	SE	5	100
FRENCH	4/24/89	1	930	7.0	6.5	7.0	33.0	51.0	0	NW	10	0
FRENCH	4/25/89	1	830	7.5	7.0	7.5	31.0	50.0	0	NW	5	0
FRENCH	4/26/89	1	830	10.5	7.5	8.5	33.0	50.0	0	SE	5	100
FRENCH	4/27/89	1	830	9.0	8.5	9.0	34.0	50.0	0	SE	5	100
FRENCH	4/28/89	1	930	10.0	8.0	8.0	36.0	49.0	0	0	0	0
FRENCH	4/29/89	1	830	11.0	8.0	8.0	33.0	49.0	0	0	0	0
FRENCH	4/30/89	1	830	11.5	8.0	8.5	31.5	49.0	0	0	0	0
FRENCH	5/1/89	1	815	11.5	8.0	9.0	33.5	49.5	0	NW	5	0
FRENCH	5/2/89	1	815	12.0	8.5	10.0	34.5	49.0	0	NW	5	100
FRENCH	5/3/89	1	815	12.0	9.0	9.0	35.5	47.0	0	NW	5	100
FRENCH	5/4/89	1	900	12.0	9.5	10.5	32.5	46.0	0	0	0	0
FRENCH	5/5/89	1	830	12.0	9.5	10.0	29.5	46.0	1	0	0	100
FRENCH	5/6/89	1	830	12.0	10.0	11.0	31.0	45.0	0	0	0	100
FRENCH	5/7/89	1	720	12.5	10.0	10.0	28.0	45.0	0	NW	5	0
FRENCH	5/8/89	1	720	15.0	10.0	10.5	27.0	43.5	0	NW	5	0
FRENCH	5/9/89	1	730	14.0	10.0	10.0	26.5	43.0	0	NW	5	90
FRENCH	5/10/89	1	830	12.5	10.0	10.0	24.5	40.0	0	SW	8	20
FRENCH	5/11/89	2	830	11.0	8.0	8.0	23.0	39.0	0	0	0	30
FRENCH	5/12/89	2	830	11.0	8.0	8.5	22.5	38.0	0	0	0	85
FRENCH	5/13/89	2	745	12.0	8.0	8.0	21.0	37.5	0	NW	5	0
FRENCH	5/14/89	2	800	12.0	7.5	8.0	19.5	37.0	0	NW	5	0
FRENCH	5/15/89	2	745	13.0	8.0	10.0	18.5	35.5	0	NW	5	30
FRENCH	5/16/89	2	830	13.0	9.5	11.5	17.5	35.0	0	N	15	90
FRENCH	5/17/89	2	800	14.0	10.0	11.0	17.0	35.0	3	SE	5	100
FRENCH	5/18/89	2	745	11.5	8.5	8.5	19.5	36.0	0	NW	5	10
FRENCH	5/19/89	2	745	11.0	8.5	9.0	18.0	35.0	0	NW	5	5
FRENCH	5/20/89	3	800	11.0	8.5	8.5	17.5	34.0	0	NW	10	0

Appendix A. Biophysical data for Black Creek, French Creek and Trent River, 1989. For all systems, gauge 1 is upstream of gauge 2.

System	Date	Period	Time	Temperature (c)			Water Level (cm)		Rain	Wind direction	Wind speed (km/hr)	Cloud cover (%)
				Maximum	Minimum	Present	Gauge 1	Gauge 2				
FRENCH	5/21/89	3	745	11.5	8.5	9.0	16.5	34.0	0	NW	5	90
FRENCH	5/22/89	3	745	13.0	9.0	9.5	16.0	33.5	0	SW	5	100
FRENCH	5/23/89	3	745	10.5	9.0	9.0	16.0	34.0	2	SE	5	100
FRENCH	5/24/89	3	900	11.0	9.0	9.0	16.8	34.0	0	E	5	60
FRENCH	5/25/89	3	900	12.0	9.0	10.0	16.0	33.0	0	E	2	20
FRENCH	5/26/89	3	800	12.0	9.0	10.0	15.0	32.5	2	SE	20	100
FRENCH	5/27/89	3	730	10.5	9.5	9.5	16.0	33.0	0	SE	5	100
FRENCH	5/28/89	3	830	11.0	9.0	9.0	16.0	33.0	0	0	0	0
FRENCH	5/29/89	3	830	13.0	9.0	10.0	15.0	32.0	0	0	0	50
FRENCH	5/30/89	3	830	13.5	10.0	11.0	14.0	32.0	0	0	0	100
FRENCH	5/31/89	3	800	14.0	12.0	12.0	13.0	31.5	0	NW	5	30
FRENCH	6/1/89	3	745	15.0	12.0	13.0	12.0	30.5	0	NW	10	0
FRENCH	6/2/89	3	800	17.5	13.0	14.0	11.0	29.5	0	NW	10	0
FRENCH	6/3/89	4	830	17.5	14.0	14.5	10.0	29.0	0	SE	10	0
FRENCH	6/4/89	4	830	18.5	14.5	14.5	10.0	29.0	0	SE	5	0
FRENCH	6/5/89	4	830	19.0	14.0	15.0	9.0	28.0	0	E	5	0
FRENCH	6/6/89	4	830	18.0	14.5	14.5	8.5	27.0	0	0	0	0
FRENCH	6/7/89	4	830	17.5	14.0	14.0	8.0	27.0	0	0	0	0
FRENCH	6/8/89	4	745	17.5	13.5	14.5	7.5	27.0	1	SE	5	100
FRENCH	6/9/89	4	800	15.5	14.0	14.0	7.5	27.0	0	NW	5	50
FRENCH	6/10/89	4	800	17.0	14.0	14.0	7.0	26.5	0	NW	5	100
FRENCH	6/11/89	4	830	17.0	14.0	14.0	7.0	26.0	0	0	0	0
FRENCH	6/12/89	4	830	18.0	14.0	15.5	6.0	25.0	0	0	0	100
FRENCH	6/13/89	4	830	17.0	15.0	15.0	6.0	25.0	1	SE	5	100
FRENCH	6/14/89	4	800	15.0	14.0	14.0	6.5	26.5	0	NW	5	40
FRENCH	6/15/89	4	800	17.0	14.0	14.0	7.0	26.5	0	NW	5	60
FRENCH	6/16/89	4	800	16.0	13.0	13.0	6.5	26.0	0	NW	5	10
FRENCH	6/17/89	4	830	15.0	12.0	12.5	6.0	25.0	3	SE	15	100
FRENCH	6/18/89	4	830	14.0	11.5	11.5	7.0	26.0	0	0	0	10
FRENCH	6/19/89	4	830	13.0	11.5	12.0	7.0	27.0	0	0	0	90
FRENCH	6/20/89	4	800	13.0	11.0	11.0	7.5	27.0	0	NW	5	0

Appendix A. Biophysical data for Black Creek, French Creek and Trent River, 1989. For all systems, gauge 1 is upstream of gauge 2.

System	Date	Period	Time	Temperature (c)			Water Level (cm)		Rain	Wind direction	Wind speed (km/hr)	Cloud cover (%)
				Maximum	Minimum	Present	Gauge 1	Gauge 2				
TRENT	4/23/89	1	800	9.0	7.0	9.0	53.0	59.0	0	0	0	0
TRENT	4/24/89	1	800	10.0	8.0	10.0	53.0	59.0	0	0	0	0
TRENT	4/25/89	1	800	10.0	6.0	6.0	55.0	60.0	0	0	0	0
TRENT	4/26/89	1	800	10.0	6.0	6.0	53.0	59.5	0	0	0	99
TRENT	4/27/89	1	800	8.0	6.0	6.0	58.0	51.5	0	0	0	85
TRENT	4/28/89	1	800	10.0	6.5	7.0	54.0	47.5	0	0	0	0
TRENT	4/29/89	1	800	10.0	6.0	7.5	58.0	53.0	0	0	0	0
TRENT	4/30/89	1	800	11.0	6.0	6.5	58.0	52.5	0	SE	10	0
TRENT	5/1/89	1	800	9.0	6.5	7.5	50.0	57.0	0	SE	10	0
TRENT	5/2/89	1	800	11.0	7.0	7.5	48.0	58.0	0	0	0	75
TRENT	5/3/89	1	800	12.0	9.0	9.0	50.0	55.0	0	0	0	99
TRENT	5/4/89	1	800	11.0	8.0	8.0	50.0	55.0	0	ENE	5	50
TRENT	5/5/89	1	800	12.0	8.0	9.0	50.0	55.0	0	0	0	100
TRENT	5/6/89	1	800	11.0	8.0	8.5	45.0	55.0	0	0	0	100
TRENT	5/7/89	1	800	11.5	8.5	9.0	44.0	54.0	0	W	3	0
TRENT	5/8/89	1	800	12.5	8.5	9.0	42.5	52.0	0	W	3	0
TRENT	5/9/89	1	800	13.0	9.0	9.0	44.0	49.0	0	ESE	5	10
TRENT	5/10/89	1	800	13.0	9.0	9.0	40.0	47.0	0	ENE	5	2
TRENT	5/11/89	1	800	12.0	7.0	7.0	39.0	44.0	0	0	0	1
TRENT	5/12/89	1	800	10.5	7.5	8.0	35.5	46.5	1	W	3	60
TRENT	5/13/89	1	800	12.5	7.0	7.5	33.8	42.5	0	O	0	0
TRENT	5/14/89	1	800	13.0	8.0	8.5	30.0	41.0	0	NW	10	0
TRENT	5/15/89	1	800	14.0	9.5	9.5	32.0	43.0	0	NNE	5	10
TRENT	5/16/89	1	800	13.0	10.0	10.0	34.0	43.5	0	WSW	3	99
TRENT	5/17/89	1	800	13.0	9.5	9.5	35.0	42.5	4	0	0	100
TRENT	5/18/89	1	800	12.5	6.5	7.5	32.5	44.5	0	NW	5	70
TRENT	5/19/89	1	800	9.5	7.0	8.5	30.5	42.3	0	N	10	30
TRENT	5/20/89	1	800	11.0	7.5	8.0	31.0	42.0	0	W	5	20
TRENT	5/21/89	1	800	11.0	8.0	8.0	29.0	39.5	0	ESE	5	25
TRENT	5/22/89	1	800	11.0	8.0	8.0	29.0	39.0	0	E	5	90
TRENT	5/23/89	1	800	11.0	8.0	8.0	28.0	38.0	1	0	0	100
TRENT	5/24/89	1	800	10.0	8.0	8.5	28.8	39.5	0	W	3	60
TRENT	5/25/89	2	800	10.5	8.5	9.5	27.5	39.0	0	NW	10	50
TRENT	5/26/89	2	800	11.5	9.0	9.5	29.5	39.0	2	N	15	90
TRENT	5/27/89	2	800	10.0	8.0	9.0	39.0	48.0	1	0	0	95
TRENT	5/28/89	2	800	11.0	8.0	9.0	34.0	44.5	0	W	5	0
TRENT	5/29/89	2	800	14.0	9.5	10.0	32.0	42.0	0	0	0	100

Appendix A. Biophysical data for Black Creek, French Creek and Trent River, 1989. For all systems, gauge 1 is upstream of gauge 2.

System	Date	Period	Time	Temperature (c)			Water Level (cm)		Rain	Wind direction	Wind speed (km/hr)	Cloud cover (%)
				Maximum	Minimum	Present	Gauge 1	Gauge 2				
TRENT	5/30/89	2	800	14.0	10.0	10.5	31.5	42.0	0	NW	10	50
TRENT	5/31/89	2	800	14.5	9.0	11.5	31.5	42.0	0	0	0	10
TRENT	6/1/89	2	800	16.5	12.0	13.0	31.5	41.5	0	N	3	0
TRENT	6/2/89	2	800	18.0	13.0	13.0	31.0	41.0	0	0	0	0
TRENT	6/3/89	2	800	18.0	13.0	14.0	29.0	39.5	0	0	0	0
TRENT	6/4/89	2	800	20.0	14.0	14.0	28.0	38.0	0	0	0	0
TRENT	6/5/89	2	800	20.0	9.5	15.0	25.5	36.5	0	0	0	0
TRENT	6/6/89	2	800	19.5	13.5	14.5	25.0	35.3	0	N	5	0
TRENT	6/7/89	2	800	18.3	13.0	14.0	23.8	34.0	0	0	0	0
TRENT	6/8/89	2	800	18.0	13.5	14.0	23.0	33.0	0	0	0	0
TRENT	6/9/89	2	800	18.5	14.0	14.0	23.0	33.0	0	WNW	3	0
TRENT	6/10/89	2	800	19.0	14.0	14.0	23.0	32.5	0	WNW	1	0
TRENT	6/11/89	2	800	18.0	14.5	15.0	22.5	31.0	0	NE	3	0
TRENT	6/12/89	2	800	19.0	15.5	16.0	21.0	30.0	0	0	0	60
TRENT	6/13/89	2	800	18.0	14.5	16.0	20.5	30.0	0	0	0	90
TRENT	6/14/89	2	800	16.0	14.0	15.0	22.0	32.5	0	0	0	25
TRENT	6/15/89	2	800	18.0	14.0	14.0	21.0	31.5	0	W	3	75
TRENT	6/16/89	2	800	17.5	14.0	14.0	23.0	31.5	0	W	5	5
TRENT	6/17/89	2	800	17.5	12.5	13.5	21.0	30.0	1	SE	5	100
TRENT	6/18/89	2	800	15.0	8.0	12.0	22.5	31.0	0	0	0	0
TRENT	6/19/89	2	800	13.5	8.0	12.0	22.0	31.0	0	0	0	50
TRENT	6/20/89	2	800	14.0	11.0	11.0	24.0	33.5	0	0	0	10
TRENT	6/21/89	2	800	14.0	11.0	11.0	24.0	33.5	1	E	5	100

APPENDIX B

Juvenile coho catch data for Black Creek, French Creek, and the Trent River, 1989.

Appendix B. Juvenile coho catch data for Black Creek, French Creek, and Trent River, 1999.

System	Date	Hours of fence operation	Number of coho fry	Number of coho parr	Number of coho smolts caught							Number of mortalities			
					Total Number	No clips	Adipose	Left ventral	Right ventral	Left maxillary	Right maxillary	Due to tagging	Due to holding	Others	Total mortalities
BLACK	4/13/99	24	0	0	0	0	0	0	0	0	0	0	0	0	0
BLACK	4/14/99	24	0	1	0	0	0	0	0	0	0	0	0	0	0
BLACK	4/15/99	24	0	0	5	5	0	0	0	0	0	2	0	0	2
BLACK	4/16/99	24	0	0	13	13	0	0	0	0	0	0	0	0	0
BLACK	4/17/99	24	0	0	45	45	0	0	0	0	0	2	0	0	2
BLACK	4/18/99	24	0	0	70	70	0	0	0	0	0	0	0	0	0
BLACK	4/19/99	24	0	0	43	43	0	0	0	0	0	0	0	0	0
	TOTAL		0	1	176	176	0	0	0	0	0	4	0	0	4
BLACK	4/20/99	24	0	0	25	25	0	0	0	0	0	0	0	0	0
BLACK	4/21/99	24	2	0	121	121	0	0	0	0	0	0	0	0	0
BLACK	4/22/99	24	0	0	101	101	0	0	0	0	0	0	0	0	0
BLACK	4/23/99	24	1	0	114	114	0	0	0	0	0	0	0	0	0
BLACK	4/24/99	24	1	0	193	193	0	0	0	0	0	2	0	0	2
BLACK	4/25/99	24	0	0	489	489	0	0	0	0	0	0	0	2	2
BLACK	4/26/99	24	0	0	731	730	0	0	0	1	0	0	0	2	2
BLACK	4/27/99	24	0	0	327	327	0	0	0	0	0	1	0	0	1
BLACK	4/28/99	24	0	0	471	471	0	0	0	0	0	0	0	0	0
BLACK	4/29/99	24	0	0	445	444	0	0	0	0	1	0	0	1	1
BLACK	4/30/99	24	0	0	534	534	0	0	0	0	0	0	0	1	1
	TOTAL		4	0	3561	3549	0	0	0	1	1	3	0	6	9
BLACK	5/1/99	24	1	0	916	916	0	0	0	0	0	0	0	2	2
BLACK	5/2/99	24	0	0	714	714	0	0	0	0	0	0	0	0	0
BLACK	5/3/99	24	0	0	227	227	0	0	0	0	0	6	0	0	6
BLACK	5/4/99	24	0	0	787	787	0	0	0	0	0	0	0	4	4
BLACK	5/5/99	24	0	0	282	282	0	0	0	0	0	0	0	0	0
BLACK	5/6/99	24	0	0	845	845	0	0	0	0	0	0	0	1	1
BLACK	5/7/99	24	0	0	356	356	0	0	0	0	0	0	0	0	0
BLACK	5/8/99	24	4	0	176	175	1	0	0	0	0	1	0	1	2
BLACK	5/9/99	24	6	0	435	435	0	0	0	0	0	1	0	1	2
BLACK	5/10/99	24	23	0	636	636	0	0	0	0	0	0	0	13	13
	TOTAL		34	0	5376	5375	1	0	0	0	0	8	0	22	30
BLACK	5/11/99	24	24	0	2677	2676	1	0	0	0	0	0	0	22	22
BLACK	5/12/99	24	13	0	899	899	0	0	0	0	0	0	1	0	1
BLACK	5/13/99	24	3	0	157	157	0	0	0	0	0	0	0	0	0
BLACK	5/14/99	24	36	0	42	42	0	0	0	0	0	0	0	4	4
BLACK	5/15/99	24	63	0	141	141	0	0	0	0	0	6	0	0	6
	TOTAL		139	0	3716	3715	1	0	0	0	0	6	1	26	33
BLACK	5/16/99	24	43	0	116	116	0	0	0	0	0	0	0	2	2
BLACK	5/17/99	24	53	0	70	70	0	0	0	0	0	0	0	2	2
BLACK	5/18/99	24	110	0	1743	1743	0	0	0	0	0	2	0	7	9
BLACK	5/19/99	24	70	0	89	88	1	0	0	0	0	0	0	0	0

Appendix B. Juvenile coho catch data for Black Creek, French Creek, and Trent River, 1989.

System	Date	Hours of fence operation	Number of coho fry	Number of coho parr	Number of coho smolts caught							Number of mortalities			
					Total Number	No clips	Adipose	Left ventral	Right ventral	Left maxillary	Right maxillary	Due to tagging	Due to holding	Others	Total mortalities
	TOTAL		276	0	2020	2019	1	0	0	0	0	2	0	11	13
BLACK	5/20/89	24	37	0	94	94	0	0	0	0	0	0	0	0	0
BLACK	5/21/89	24	81	0	142	142	0	0	0	0	0	0	0	0	0
BLACK	5/22/89	24	65	0	133	133	0	0	0	0	0	0	0	1	1
BLACK	5/23/89	24	58	0	274	274	0	0	0	0	0	0	0	1	1
BLACK	5/24/89	24	45	0	435	435	0	0	0	0	0	0	0	4	4
BLACK	5/25/89	24	33	0	3993	3993	0	0	0	0	0	1	0	1	2
BLACK	5/26/89	24	22	0	1280	1279	1	0	0	0	0	0	1	0	1
BLACK	5/27/89	24	21	0	824	824	0	0	0	0	0	0	0	2	2
BLACK	5/28/89	24	19	0	1000	1000	0	0	0	0	0	5	0	10	15
BLACK	5/29/89	24	28	0	873	872	1	0	0	0	0	0	0	1	1
BLACK	5/30/89	24	11	0	2081	2081	0	0	0	0	0	0	0	2	2
BLACK	5/31/89	24	6	0	250	250	0	0	0	0	0	0	0	0	0
BLACK	6/1/89	24	9	0	1082	1082	0	0	0	0	0	0	0	2	2
BLACK	6/2/89	24	9	0	887	887	0	0	0	0	0	0	0	2	2
	TOTAL		444	0	13328	13326	2	0	0	0	0	6	1	26	33
BLACK	6/3/89	24	4	0	759	759	0	0	0	0	0	0	0	9	9
BLACK	6/4/89	24	4	0	287	287	0	0	0	0	0	0	0	0	0
BLACK	6/5/89	24	1	0	529	529	0	0	0	0	0	0	0	1	1
BLACK	6/6/89	24	0	0	17	17	0	0	0	0	0	0	0	1	1
BLACK	6/7/89	24	0	0	22	22	0	0	0	0	0	0	0	0	0
BLACK	6/8/89	24	3	0	15	15	0	0	0	0	0	0	0	1	1
BLACK	6/9/89	24	5	0	8	8	0	0	0	0	0	0	0	0	0
BLACK	6/10/89	24	3	0	4	4	0	0	0	0	0	0	0	0	0
BLACK	6/11/89	24	1	0	16	16	0	0	0	0	0	0	0	1	1
BLACK	6/12/89	24	7	0	7	7	0	0	0	0	0	0	0	0	0
BLACK	6/13/89	24	3	0	14	14	0	0	0	0	0	0	0	1	1
BLACK	6/14/89	24	2	0	6	6	0	0	0	0	0	0	0	0	0
BLACK	6/15/89	24	7	0	2	2	0	0	0	0	0	0	0	0	0
BLACK	6/16/89	24	3	0	2	2	0	0	0	0	0	0	0	0	0
BLACK	6/17/89	24	0	0	0	0	0	0	0	0	0	0	0	0	0
BLACK	6/18/89	24	4	0	2	2	0	0	0	0	0	0	0	0	0
BLACK	6/19/89	24	0	0	0	0	0	0	0	0	0	0	0	0	0
BLACK	6/20/89	24	3	0	0	0	0	0	0	0	0	0	0	0	0
BLACK	6/21/89	24	4	0	0	0	0	0	0	0	0	0	0	0	0
BLACK	6/22/89	24	2	0	2	2	0	0	0	0	0	0	0	0	0
BLACK	6/23/89	24	3	0	3	3	0	0	0	0	0	0	0	0	0
	TOTAL		59	0	1695	1695	0	0	0	0	0	0	0	14	14
GRAND TOTAL			956	1	29862	29855	5	0	0	1	1	29	2	105	136

Appendix B. Juvenile coho catch data for Black Creek, French Creek, and Trent River, 1999.

System	Date	Hours of fence operation	Number of coho fry	Number of coho parr	Number of coho smolts caught							Number of mortalities			
					Total Number	No clips	Adipose	Left ventral	Right ventral	Left maxillary	Right maxillary	Due to tagging	Due to holding	Others	Total mortalities
FRENCH	4/17/99	24	0	1	7	2	0	5	0	0	0	0	0	0	0
FRENCH	4/18/99	24	0	0	7	2	0	5	0	0	0	1	0	0	1
FRENCH	4/19/99	24	0	0	9	2	0	4	3	0	0	0	0	0	0
FRENCH	4/20/99	24	0	1	20	8	0	3	9	0	0	0	0	0	0
FRENCH	4/21/99	24	0	0	53	28	0	7	18	0	0	0	0	1	1
FRENCH	4/22/99	24	0	0	22	13	0	4	5	0	0	0	0	1	1
FRENCH	4/23/99	24	8	0	8	5	0	0	3	0	0	0	1	1	2
FRENCH	4/24/99	24	0	0	12	4	0	2	6	0	0	0	0	0	0
FRENCH	4/25/99	24	0	0	9	7	0	1	1	0	0	0	0	0	0
FRENCH	4/26/99	24	0	0	12	6	0	2	4	0	0	0	0	0	0
FRENCH	4/27/99	24	1	0	48	10	0	8	30	0	0	0	0	0	0
FRENCH	4/28/99	24	0	0	36	18	0	1	17	0	0	1	0	0	1
FRENCH	4/29/99	24	0	0	119	32	0	17	70	0	0	0	0	0	0
FRENCH	4/30/99	24	0	0	79	17	0	13	49	0	0	0	0	0	0
FRENCH	5/1/99	24	0	0	168	75	0	17	76	0	0	0	0	0	0
FRENCH	5/2/99	24	0	0	0	0	0	0	0	0	0	0	0	0	0
FRENCH	5/3/99	24	0	0	4	4	0	0	0	0	0	0	0	4	4
FRENCH	5/4/99	24	0	0	127	79	0	10	38	0	0	0	0	0	0
FRENCH	5/5/99	24	0	0	189	115	0	8	66	0	0	0	1	9	10
FRENCH	5/6/99	24	0	0	366	306	0	15	75	0	0	0	0	6	6
FRENCH	5/7/99	24	0	0	239	193	0	12	34	0	0	0	0	5	5
FRENCH	5/8/99	24	0	0	69	63	0	0	6	0	0	0	0	5	5
FRENCH	5/9/99	24	1	0	465	411	0	5	49	0	0	0	0	2	2
FRENCH	5/10/99	24	0	0	416	397	0	0	19	0	0	0	0	3	3
	TOTAL		10	2	2514	1797	0	139	576	0	0	2	2	37	41
FRENCH	5/11/99	24	0	0	201	194	0	2	5	0	0	0	1	0	1
FRENCH	5/12/99	24	0	1	368	361	0	0	7	0	0	0	0	0	0
FRENCH	5/13/99	24	1	0	364	358	0	1	5	0	0	0	0	2	2
FRENCH	5/14/99	24	0	0	283	272	0	0	11	0	0	0	0	2	2
FRENCH	5/15/99	24	0	0	275	267	0	0	8	0	0	0	0	1	1
FRENCH	5/16/99	24	1	0	806	800	0	0	6	0	0	0	1	0	1
FRENCH	5/17/99	24	1	0	718	716	0	0	2	0	0	0	1	2	3
FRENCH	5/18/99	24	3	0	489	486	0	0	3	0	0	0	1	1	2
FRENCH	5/19/99	24	4	0	584	582	0	1	1	0	0	2	0	2	4
	TOTAL		10	1	4088	4036	0	4	48	0	0	2	4	10	16
FRENCH	5/20/99	24	0	0	419	417	0	0	2	0	0	0	0	0	0
FRENCH	5/21/99	24	0	0	540	540	0	0	0	0	0	0	0	2	2
FRENCH	5/22/99	24	6	0	503	502	0	0	1	0	0	1	0	1	2
FRENCH	5/23/99	24	10	0	391	388	0	1	2	0	0	2	0	1	3
FRENCH	5/24/99	24	2	1	539	537	0	0	2	0	0	0	1	0	1
FRENCH	5/25/99	24	7	0	556	556	0	0	0	0	0	0	1	0	1

Appendix B. Juvenile coho catch data for Black Creek, French Creek, and Trent River, 1989.

System	Date	Hours of fence operation	Number of coho fry	Number of coho parr	Number of coho smolts caught							Number of mortalities			
					Total Number	No clips	Adipose	Left ventral	Right ventral	Left maxillary	Right maxillary	Due to tagging	Due to holding	Others	Total mortalities
FRENCH	5/26/89	24	5	0	381	380	0	0	1	0	0	0	0	0	0
FRENCH	5/27/89	24	4	0	397	396	0	1	0	0	0	2	0	0	2
FRENCH	5/28/89	24	6	0	476	476	0	0	0	0	0	0	0	1	1
FRENCH	5/29/89	24	8	0	224	224	0	0	0	0	0	1	1	2	4
FRENCH	5/30/89	24	10	0	339	339	0	0	0	0	0	2	0	0	2
FRENCH	5/31/89	24	19	0	274	274	0	0	0	0	0	0	0	3	3
FRENCH	6/1/89	24	6	0	123	123	0	0	0	0	0	0	0	1	1
FRENCH	6/2/89	24	6	0	134	133	0	0	1	0	0	0	0	0	0
	TOTAL		86	1	5276	5265	0	2	9	0	0	8	3	11	22
FRENCH	6/3/89	24	8	0	137	137	0	0	0	0	0	0	0	1	1
FRENCH	6/4/89	24	15	0	53	53	0	0	0	0	0	0	0	0	0
FRENCH	6/5/89	24	30	0	58	58	0	0	0	0	0	0	0	1	1
FRENCH	6/6/89	24	90	0	53	52	0	1	0	0	0	0	0	0	0
FRENCH	6/7/89	24	134	0	41	41	0	0	0	0	0	0	0	0	0
FRENCH	6/8/89	24	169	0	33	33	0	0	0	0	0	0	0	0	0
FRENCH	6/9/89	24	264	0	14	13	0	0	1	0	0	0	0	0	0
FRENCH	6/10/89	24	309	0	25	25	0	0	0	0	0	0	0	1	1
FRENCH	6/11/89	24	350	0	17	17	0	0	0	0	0	0	0	0	0
FRENCH	6/12/89	24	272	0	4	4	0	0	0	0	0	1	0	0	1
FRENCH	6/13/89	24	163	0	5	5	0	0	0	0	0	0	0	0	0
FRENCH	6/14/89	24	191	0	4	4	0	0	0	0	0	0	0	0	0
FRENCH	6/15/89	24	145	0	10	10	0	0	0	0	0	0	0	0	0
FRENCH	6/16/89	24	81	0	2	2	0	0	0	0	0	0	0	0	0
FRENCH	6/17/89	24	40	0	0	0	0	0	0	0	0	0	0	0	0
FRENCH	6/18/89	24	23	0	1	1	0	0	0	0	0	0	0	0	0
FRENCH	6/19/89	24	36	0	0	0	0	0	0	0	0	0	0	0	0
FRENCH	6/20/89	24	70	0	2	2	0	0	0	0	0	0	0	0	0
	TOTAL		2384	0	459	457	0	1	1	0	0	1	0	3	4
GRAND TOTAL			2492	4	12337	11555	0	146	636	0	0	13	9	61	83
TRENT	4/23/89	24	0	0	0	0	0	0	0	0	0	0	0	0	0
TRENT	4/24/89	24	0	0	0	0	0	0	0	0	0	0	0	0	0
TRENT	4/25/89	24	0	0	0	0	0	0	0	0	0	0	0	0	0
TRENT	4/26/89	24	0	0	0	0	0	0	0	0	0	0	0	0	0
TRENT	4/27/89	24	0	0	0	0	0	0	0	0	0	0	0	0	0
TRENT	4/28/89	24	1	0	0	0	0	0	0	0	0	0	0	0	0
TRENT	4/29/89	24	0	0	0	0	0	0	0	0	0	0	0	0	0
TRENT	4/30/89	24	1	0	88	9	0	10	40	27	2	0	2	0	2
TRENT	5/1/89	24	0	3	101	20	0	21	22	33	5	0	0	0	0
TRENT	5/2/89	24	0	5	0	0	0	0	0	0	0	0	0	0	0
TRENT	5/3/89	24	7	2	0	0	0	0	0	0	0	0	0	0	0

Appendix B. Juvenile coho catch data for Black Creek, French Creek, and Trent River, 1999.

System	Date	Hours of fence operation	Number of coho fry	Number of coho parr	Number of coho smolts caught							Number of mortalities			
					Total Number	No clips	Adipose	Left ventral	Right ventral	Left maxillary	Right maxillary	Due to tagging	Due to holding	Others	Total mortalities
TRENT	5/4/99	24	2	0	138	19	0	12	83	19	5	0	0	0	0
TRENT	5/5/99	24	2	5	176	25	0	21	97	28	5	0	0	0	0
TRENT	5/6/99	24	2	14	401	67	0	37	227	53	17	0	1	0	1
TRENT	5/7/99	24	29	3	585	84	0	47	370	58	26	0	0	15	15
TRENT	5/8/99	24	67	2	306	40	0	30	185	40	11	5	0	5	10
TRENT	5/9/99	24	21	0	356	29	0	63	211	34	19	0	10	1	11
TRENT	5/10/99	24	13	1	451	26	0	82	275	55	13	0	1	5	6
TRENT	5/11/99	24	3	0	242	31	0	17	135	34	25	0	1	5	6
TRENT	5/12/99	24	11	1	267	65	0	20	143	27	12	0	1	4	5
TRENT	5/13/99	24	6	0	266	72	0	29	155	13	17	0	0	5	5
TRENT	5/14/99	24	0	0	171	30	0	37	76	19	9	0	4	0	4
TRENT	5/15/99	24	6	0	261	50	0	39	131	28	13	0	4	1	5
TRENT	5/16/99	24	6	0	356	68	0	59	176	43	10	1	10	5	16
TRENT	5/17/99	24	3	1	263	62	0	36	129	23	13	2	0	0	2
TRENT	5/18/99	24	11	2	625	161	0	64	262	53	65	6	1	0	7
TRENT	5/19/99	24	0	2	624	185	0	97	226	40	76	0	1	1	2
TRENT	5/20/99	24	3	0	253	153	1	33	12	15	39	0	0	3	3
TRENT	5/21/99	24	0	0	282	88	1	41	117	28	7	0	3	0	3
TRENT	5/22/99	24	0	0	303	103	0	41	132	23	4	0	0	3	3
TRENT	5/23/99	24	2	0	266	60	0	45	114	30	17	0	0	0	0
TRENT	5/24/99	24	1	1	686	206	1	150	232	10	87	0	3	0	3
	TOTAL		197	42	7487	1673	3	1031	3660	733	497	14	42	53	109
TRENT	5/25/99	24	3	0	727	268	0	163	200	26	70	2	5	5	12
TRENT	5/26/99	24	0	0	423	146	0	136	88	14	37	1	0	0	1
TRENT	5/27/99	24	4	0	394	121	0	88	136	32	17	0	0	0	0
TRENT	5/28/99	24	6	0	231	104	0	47	48	9	23	0	4	0	4
TRENT	5/29/99	24	11	0	117	52	0	36	15	3	9	0	4	0	4
TRENT	5/30/99	24	6	0	228	94	0	70	26	6	33	0	6	8	14
TRENT	5/31/99	24	2	0	362	158	0	92	44	5	63	0	3	2	5
TRENT	6/1/99	24	7	0	355	159	0	91	36	3	66	0	0	6	6
TRENT	6/2/99	24	5	0	395	124	0	94	89	10	78	0	0	5	5
TRENT	6/3/99	24	0	0	143	43	0	49	32	2	17	0	0	0	0
TRENT	6/4/99	24	5	7	319	115	0	101	57	4	42	0	0	5	5
TRENT	6/5/99	24	2	4	566	231	0	157	72	11	95	1	0	26	27
TRENT	6/6/99	24	4	7	292	119	0	76	46	6	45	0	1	4	5
TRENT	6/7/99	24	1	3	79	43	0	12	11	2	11	0	0	6	6
TRENT	6/8/99	24	3	5	161	63	0	45	18	3	32	0	0	5	5
TRENT	6/9/99	24	5	33	83	31	0	24	13	2	13	0	0	0	0
TRENT	6/10/99	24	6	21	134	38	0	41	21	1	32	1	0	5	6
TRENT	6/11/99	24	2	32	60	29	0	22	2	0	7	0	0	5	5
TRENT	6/12/99	24	3	60	75	25	0	19	5	1	25	0	2	2	4
TRENT	6/13/99	24	8	66	17	9	0	4	1	0	3	2	0	0	2

Appendix B. Juvenile coho catch data for Black Creek, French Creek, and Trent River, 1989.

System	Date	Hours of fence operation	Number of coho fry	Number of coho parr	Number of coho smolts caught							Number of mortalities			
					Total Number	No clips	Adipose	Left ventral	Right ventral	Left maxillary	Right maxillary	Due to tagging	Due to holding	Others	Total mortalities
TRENT	6/14/89	24	47	31	0	0	0	0	0	0	0	0	0	0	0
TRENT	6/15/89	24	42	31	14	8	0	1	0	1	4	0	0	3	3
TRENT	6/16/89	24	57	9	33	15	0	8	1	1	8	0	0	0	0
TRENT	6/17/89	24	0	26	3	3	0	0	0	0	0	0	0	2	2
TRENT	6/18/89	24	2	7	0	0	0	0	0	0	0	0	0	0	0
TRENT	6/19/89	24	0	13	0	0	0	0	0	0	0	0	0	0	0
TRENT	6/20/89	24	6	21	0	0	0	0	0	0	0	0	0	0	0
TRENT	6/21/89	24	7	11	5	5	0	0	0	0	0	0	0	0	0
	TOTAL		246	397	5216	2004	0	1380	980	142	730	7	25	89	121
GRAND TOTAL			443	439	12703	3677	3	2411	4510	675	1227	21	67	142	230

APPENDIX C

Non-coho catch data for Black Creek,
French Creek, and the Trent River, 1989.

Appendix C. Non coho catch data for Black Creek, French Creek, and Trent River, 1989.

System	Date	Steelhead						Cutthroat						Cottids	Lamprey	Stickleback	Chum fry
		Fry	Parr	Wild smolt	Hatchery smolt	Adult	Kelt	Fry	Parr	Smolt	Adult	Wild kelt	Hatchery kelt				
BLACK	4/13/89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BLACK	4/14/89	0	0	0	0	0	0	0	0	0	0	2	3	8	0	0	0
BLACK	4/15/89	0	0	0	0	0	0	0	0	0	0	1	4	11	0	3	0
BLACK	4/16/89	0	0	0	0	0	0	0	0	0	0	0	8	15	1	2	0
BLACK	4/17/89	0	0	0	0	0	0	0	0	0	0	0	1	12	0	2	0
BLACK	4/18/89	0	0	0	0	0	0	0	0	0	0	0	1	14	0	1	0
BLACK	4/19/89	0	0	0	0	0	0	0	0	0	0	0	0	25	0	1	0
BLACK	4/20/89	0	0	5	0	0	1	0	0	0	0	8	13	10	0	2	0
BLACK	4/21/89	0	0	3	0	0	0	0	0	1	0	0	4	23	0	5	0
BLACK	4/22/89	0	0	1	0	0	0	0	0	0	0	2	3	14	0	6	0
BLACK	4/23/89	0	0	2	0	0	1	0	0	0	0	0	1	11	0	2	0
BLACK	4/24/89	0	0	8	0	0	0	0	0	0	0	2	3	15	0	4	0
BLACK	4/25/89	0	0	7	0	0	0	0	0	5	0	2	9	17	0	0	0
BLACK	4/26/89	0	1	6	0	0	0	0	0	1	0	4	2	10	0	0	0
BLACK	4/27/89	0	0	2	0	0	0	0	0	0	0	1	2	12	0	1	0
BLACK	4/28/89	0	1	5	0	0	0	0	0	0	0	0	5	8	1	1	0
BLACK	4/29/89	0	1	2	0	0	0	0	0	0	0	0	6	8	0	1	0
BLACK	4/30/89	0	0	0	0	0	0	0	0	0	0	0	1	3	0	1	0
BLACK	5/1/89	0	0	6	0	0	0	0	0	0	0	2	3	31	1	1	0
BLACK	5/2/89	0	0	2	0	0	0	0	0	1	0	0	1	17	0	1	0
BLACK	5/3/89	0	0	0	0	0	0	0	0	0	0	0	0	14	0	1	0
BLACK	5/4/89	0	0	10	0	0	0	0	0	2	0	3	3	11	0	3	0
BLACK	5/5/89	0	0	0	0	0	0	0	0	0	0	1	3	9	0	2	0
BLACK	5/6/89	0	0	2	0	0	0	0	0	0	0	2	2	3	0	1	0
BLACK	5/7/89	0	0	0	0	0	0	0	0	0	0	0	0	14	0	2	0
BLACK	5/8/89	0	0	0	0	0	0	0	0	0	0	0	0	16	1	1	0
BLACK	5/9/89	0	0	0	0	0	0	0	0	0	0	0	0	11	1	1	0
BLACK	5/10/89	0	0	0	0	0	0	0	0	1	0	0	1	26	2	8	0
BLACK	5/11/89	0	0	4	0	0	1	0	0	2	0	0	1	0	0	0	0
BLACK	5/12/89	0	0	3	0	0	0	0	0	0	0	0	0	0	0	1	0
BLACK	5/13/89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BLACK	5/14/89	0	0	0	0	0	0	0	0	0	0	0	0	12	1	3	0
BLACK	5/15/89	0	0	0	0	0	0	0	0	1	0	0	0	4	1	2	0
BLACK	5/16/89	0	0	1	0	0	0	0	0	0	0	0	0	7	0	7	0
BLACK	5/17/89	0	0	0	0	0	0	0	0	1	0	0	0	11	0	0	0
BLACK	5/18/89	0	0	1	0	0	0	0	0	0	0	0	0	9	1	1	0
BLACK	5/19/89	0	0	0	0	0	0	0	0	0	0	0	0	3	1	2	0

Appendix C. Non coho catch data for Black Creek, French Creek, and Trent River, 1989.

System	Date	Steelhead						Cutthroat						Cottids	Lamprey	Stickleback	Chum fry
		Fry	Parr	Wild smolt	Hatchery smolt	Adult	Kelt	Fry	Parr	Smolt	Adult	Wild kelt	Hatchery kelt				
BLACK	5/20/89	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
BLACK	5/21/89	0	0	0	0	0	0	0	0	0	0	0	0	4	0	2	0
BLACK	5/22/89	0	0	0	0	0	0	0	0	0	0	0	0	8	0	3	0
BLACK	5/23/89	0	0	0	0	0	0	0	0	0	0	0	0	5	1	5	0
BLACK	5/24/89	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0
BLACK	5/25/89	0	0	7	0	0	0	0	0	0	0	0	2	3	0	1	0
BLACK	5/26/89	0	0	0	0	0	0	0	0	0	0	1	1	3	0	3	0
BLACK	5/27/89	0	0	0	0	0	0	0	0	0	0	0	0	6	0	1	0
BLACK	5/28/89	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
BLACK	5/29/89	0	0	0	0	0	0	0	0	0	0	0	0	15	1	4	0
BLACK	5/30/89	0	0	2	0	0	0	0	0	0	0	0	1	17	0	2	0
BLACK	5/31/89	0	0	0	0	0	0	0	0	0	0	0	0	6	0	1	0
BLACK	6/1/89	0	0	2	0	0	0	0	0	0	0	0	0	39	0	2	0
BLACK	6/2/89	0	0	0	0	0	0	0	0	0	0	0	0	32	1	1	0
BLACK	6/3/89	0	0	1	0	0	0	0	0	1	0	0	1	5	1	2	0
BLACK	6/4/89	0	0	1	0	0	0	0	0	0	0	0	0	36	2	3	0
BLACK	6/5/89	0	0	1	0	0	0	0	0	1	0	0	0	21	1	6	0
BLACK	6/6/89	0	0	0	0	0	0	0	0	0	0	0	0	19	1	0	0
BLACK	6/7/89	0	0	0	0	0	0	0	0	0	0	0	0	6	1	2	0
BLACK	6/8/89	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0
BLACK	6/9/89	0	0	0	0	0	0	0	0	0	0	0	0	6	1	1	0
BLACK	6/10/89	0	0	0	0	0	0	0	0	0	0	0	0	11	1	0	0
BLACK	6/11/89	0	0	0	0	0	0	0	0	0	0	0	0	12	1	1	0
BLACK	6/12/89	0	0	0	0	0	0	0	0	0	0	0	0	7	0	1	0
BLACK	6/13/89	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0
BLACK	6/14/89	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
BLACK	6/15/89	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0
BLACK	6/16/89	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	0
BLACK	6/17/89	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0
BLACK	6/18/89	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0
BLACK	6/19/89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BLACK	6/20/89	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
BLACK	6/21/89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BLACK	6/22/89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BLACK	6/23/89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	Total	0	3	84	0	0	3	0	0	17	0	31	85	733	25	117	0

Appendix C. Non coho catch data for Black Creek, French Creek, and Trent River, 1989.

		Steelhead						Cutthroat									
System	Date	Fry	Parr	Wild smolt	Hatchery smolt	Adult	Kelt	Fry	Parr	Smolt	Adult	Wild kelt	Hatchery kelt	Cottids	Lamprey	Stickleback	Chum fry
FRENCH	4/17/89	0	2	0	0	0	1	0	2	3	0	0	0	27	0	1	0
FRENCH	4/18/89	0	1	8	0	0	0	0	0	4	0	0	0	26	0	1	0
FRENCH	4/19/89	0	8	6	0	0	0	0	0	5	0	0	0	24	0	1	0
FRENCH	4/20/89	0	8	29	0	0	0	0	0	10	0	2	0	57	0	0	0
FRENCH	4/21/89	0	0	56	0	0	0	0	1	7	1	0	0	51	0	3	0
FRENCH	4/22/89	0	0	7	0	0	0	0	0	2	0	0	0	14	0	0	0
FRENCH	4/23/89	1	1	4	0	0	0	0	0	0	0	0	0	13	0	0	0
FRENCH	4/24/89	0	0	9	0	0	0	0	0	2	2	1	0	14	0	5	0
FRENCH	4/25/89	0	2	13	0	0	0	0	0	5	0	0		17	0	3	0
FRENCH	4/26/89	0	10	21	0	0	0	0	0	6	0	1	0	27	0	2	0
FRENCH	4/27/89	0	18	19	0	0	0	0	0	6	0	0	0	19	0	3	0
FRENCH	4/28/89	0	15	32	0	0	0	0	1	4	0	0	0	14	0	2	0
FRENCH	4/29/89	0	14	107	0	0	1	0	0	12	0	0	0	13	0	0	0
FRENCH	4/30/89	0	17	55	0	0	0	0	0	6	0	0	0	11	0	1	0
FRENCH	5/1/89	0	7	106	0	0	0	0	0	16	0	1	0	19	0	0	0
FRENCH	5/2/89	0	6	56	0	0	1	0	0	13	0	0	0	12	0	1	0
FRENCH	5/3/89	0	17	32	0	0	0	0	1	11	0	1	0	12	0	2	0
FRENCH	5/4/89	0	0	56	0	0	0	0	0	10	0	1	0	11	0	2	0
FRENCH	5/5/89	0	13	55	0	0	0	0	2	5	0	0	0	5	0	1	0
FRENCH	5/6/89	0	16	160	0	0	0	0	1	19	0	2	0	7	0	1	0
FRENCH	5/7/89	0	43	44	0	0	0	0	0	13	0	0	0	4	0	0	0
FRENCH	5/8/89	0	9	19	0	0	0	0	0	6	0	0	0	4	0	2	0
FRENCH	5/9/89	0	41	77	0	0	3	0	0	15	0	0	0	4	0	3	0
FRENCH	5/10/89	0	16	117	0	0	0	0	0	5	0	0	0	3	0	1	0
FRENCH	5/11/89	0	10	50	0	0	0	0	1	10	0	0	0	3	0	1	0
FRENCH	5/12/89	0	8	179	0	0	1	0	0	17	0	1	0	2	0	2	0
FRENCH	5/13/89	0	24	56	0	0	0	0	1	5	0	0	0	2	1	7	1
FRENCH	5/14/89	0	18	56	0	0	0	0	0	7	0	0	0	3	0	0	0
FRENCH	5/15/89	0	20	4	0	0	0	0	0	5	0	0	0	2	0	6	2
FRENCH	5/16/89	0	21	71	0	2	1	0	0	7	0	0	0	6	0	2	2
FRENCH	5/17/89	0	33	50	0	0	1	0	0	15	0	1	0	2	0	0	1
FRENCH	5/18/89	0	89	92	0	0	1	0	3	21	0	0	0	1	0	3	1
FRENCH	5/19/89	0	51	87	0	0	0	0	2	23	0	0	0	4	1	3	1
FRENCH	5/20/89	0	18	15	0	0	0	0	0	3	0	0	0	1	1	3	0
FRENCH	5/21/89	0	18	11	0	0	0	0	1	2	0	0	0	1	2	2	0
FRENCH	5/22/89	0	23	6	0	0	0	0	1	0	0	0	0	1	0	0	2

Appendix C. Non coho catch data for Black Creek, French Creek, and Trent River, 1989.

System	Date	Steelhead						Cutthroat						Cottids	Lamprey	Stickleback	Chum fry
		Fry	Parr	Wild smolt	Hatchery smolt	Adult	Kelt	Fry	Parr	Smolt	Adult	Wild kelt	Hatchery kelt				
FRENCH	5/23/89	0	14	13	0	0	0	0	0	3	0	0	0	5	0	3	2
FRENCH	5/24/89	0	23	51	0	0	0	0	0	7	0	0	0	1	0	3	1
FRENCH	5/25/89	0	19	11	0	0	0	0	0	1	0	0	0	2	0	0	0
FRENCH	5/26/89	0	5	6	0	0	0	0	1	0	0	0	0	2	0	3	0
FRENCH	5/27/89	0	39	116	0	0	1	0	1	27	0	0	0	2	2	1	0
FRENCH	5/28/89	0	33	242	0	0	0	0	2	39	1	0	0	3	0	1	1
FRENCH	5/29/89	0	20	15	0	0	0	0	0	2	0	1	0	3	0	2	1
FRENCH	5/30/89	0	56	191	0	0	0	0	0	10	0	0	0	12	1	4	0
FRENCH	5/31/89	0	101	163	0	0	1	0	1	31	0	1	0	4	0	3	1
FRENCH	6/1/89	0	75	92	0	0	0	0	0	36	0	0	0	8	1	6	2
FRENCH	6/2/89	0	114	79	0	0	0	0	1	28	0	1	0	10	1	5	0
FRENCH	6/3/89	0	43	88	0	0	0	0	0	20	0	0	0	6	0	31	1
FRENCH	6/4/89	0	18	27	0	0	1	0	0	3	0	0	0	14	2	38	2
FRENCH	6/5/89	0	5	10	0	0	0	0	0	2	0	0	0	22	0	56	3
FRENCH	6/6/89	0	6	9	0	0	0	0	0	3	0	0	0	31	0	92	3
FRENCH	6/7/89	0	4	2	0	0	0	0	0	3	0	0	0	39	0	107	6
FRENCH	6/8/89	0	6	0	0	0	0	0	0	1	0	0	0	24	0	67	1
FRENCH	6/9/89	0	0	0	0	0	0	0	0	0	0	0	0	29	0	74	18
FRENCH	6/10/89	0	5	0	0	0	0	0	0	0	0	0	0	24	0	52	3
FRENCH	6/11/89	0	0	7	0	0	0	0	0	1	0	0	0	30	0	59	2
FRENCH	6/12/89	0	0	0	0	0	0	0	0	1	0	0	0	29	0	38	0
FRENCH	6/13/89	0	0	0	0	0	0	0	0	0	0	0	0	16	0	21	1
FRENCH	6/14/89	7	1	0	0	0	0	0	0	0	0	0	0	27	0	8	5
FRENCH	6/15/89	18	2	0	0	0	0	0	0	2	0	0	0	21	0	17	2
FRENCH	6/16/89	14	0	0	0	0	3	0	0	0	0	0	0	8	0	12	0
FRENCH	6/17/89	8	0	0	0	0	0	0	0	0	0	0	0	7	0	6	1
FRENCH	6/18/89	11	0	0	0	0	0	0	0	0	0	0	0	1	0	4	1
FRENCH	6/19/89	15	0	1	0	0	0	0	0	0	0	0	0	5	0	13	0
FRENCH	6/20/89	31	1	0	0	0	0	0	0	0	0	0	0	3	0	8	1
	Total	105	1187	2888	0	2	16	0	23	520	4	14	0	824	12	798	68

Appendix C. Non coho catch data for Black Creek, French Creek, and Trent River, 1989.

System	Date	Steelhead						Cutthroat						Cottids	Lamprey	Stickleback	Chum fry
		Fry	Parr	Wild smolt	Hatchery smolt	Adult	Kelt	Fry	Parr	Smolt	Adult	Wild kelt	Hatchery kelt				
TRENT	4/27/89	0	1	0	0	0	0	0	0	0	0	0	0	35	0	0	0
TRENT	4/28/89	0	0	0	0	0	0	0	0	0	0	0	0	44	0	0	0
TRENT	4/29/89	0	1	1	0	0	0	0	1	0	0	0	0	117	0	0	0
TRENT	4/30/89	0	12	3	0	0	1	0	0	0	0	0	0	47	0	0	0
TRENT	5/1/89	0	6	7	2	0	0	0	2	2	0	0	0	69	0	0	0
TRENT	5/2/89	0	7	8	0	0	0	0	4	0	0	0	0	89	0	0	0
TRENT	5/3/89	5	11	18	1	0	0	0	0	0	0	1	0	53	1	0	0
TRENT	5/4/89	4	13	7	1	0	2	0	0	0	0	0	0	66	0	0	0
TRENT	5/5/89	0	10	10	0	0	0	0	1	1	0	0	0	57	0	0	0
TRENT	5/6/89	0	17	29	0	0	1	0	2	0	0	0	0	59	0	0	0
TRENT	5/7/89	0	13	28	3	0	1	0	3	1	0	0	0	34	0	0	0
TRENT	5/8/89	0	11	14	2	0	0	0	5	0	0	1	0	34	0	0	1
TRENT	5/9/89	0	7	11	2	0	0	0	1	0	0	0	0	32	0	0	0
TRENT	5/10/89	0	9	19	0	0	1	0	1	0	0	0	0	32	0	0	0
TRENT	5/11/89	0	21	11	1	0	0	0	0	0	0	0	0	27	0	0	12
TRENT	5/12/89	0	19	11	0	0	0	0	4	0	0	0	0	23	1	0	17
TRENT	5/13/89	0	12	6	0	0	0	0	0	0	0	0	0	8	0	0	43
TRENT	5/14/89	0	4	7	2	0	0	0	0	0	0	0	0	4	0	0	3
TRENT	5/15/89	0	11	3	0	0	0	0	0	0	0	0	0	38	0	0	67
TRENT	5/16/89	0	15	51	2	0	0	0	0	0	0	0	0	21	0	1	6
TRENT	5/17/89	0	12	13	0	0	1	0	1	0	0	0	0	17	0	0	550
TRENT	5/18/89	0	9	23	2	0	2	0	4	0	0	0	0	17	0	0	1000
TRENT	5/19/89	0	4	12	0	0	1	0	0	0	0	0	0	9	0	0	250
TRENT	5/20/89	0	4	4	0	0	0	0	1	1	0	0	0	5	0	0	100
TRENT	5/21/89	0	6	1	0	0	0	0	0	0	0	0	0	13	0	0	250
TRENT	5/22/89	0	6	0	0	0	0	0	0	0	0	0	0	7	0	0	30
TRENT	5/23/89	0	6	8	0	0	0	0	0	0	0	0	0	7	0	0	27
TRENT	5/24/89	0	6	14	2	0	1	0	3	0	0	0	0	11	0	1	2
TRENT	5/25/89	0	12	12	1	0	0	1	0	0	0	0	0	9	0	0	2
TRENT	5/26/89	0	10	9	0	0	0	0	4	2	0	0	0	5	1	0	0
TRENT	5/27/89	0	52	79	4	0	1	0	0	4	0	0	0	17	0	0	0
TRENT	5/28/89	0	16	30	3	0	0	0	0	1	0	0	0	9	0	0	0
TRENT	5/29/89	0	13	2	0	0	0	0	2	0	0	0	0	9	0	0	75
TRENT	5/30/89	0	5	3	0	0	0	0	4	0	0	0	0	6	0	0	56
TRENT	5/31/89	0	9	8	1	0	0	0	0	1	0	0	0	10	0	0	1
TRENT	6/1/89	0	9	9	1	0	0	0	0	1	0	0	0	5	0	0	3

Appendix C. Non coho catch data for Black Creek, French Creek, and Trent River, 1989.

System	Date	Steelhead						Cutthroat						Cottids	Lamprey	Stickleback	Chum fry
		Fry	Parr	Wild smolt	Hatchery smolt	Adult	Kelt	Fry	Parr	Smolt	Adult	Wild kelt	Hatchery kelt				
TRENT	6/2/89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRENT	6/3/89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRENT	6/4/89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRENT	6/5/89	0	12	44	0	0	0	0	6	2	0	0	0	14	1	0	0
TRENT	6/6/89	0	9	17	3	0	0	0	5	0	0	0	0	13	0	0	0
TRENT	6/7/89	0	1	1	2	0	0	0	1	0	0	0	0	10	0	0	0
TRENT	6/8/89	0	6	1	0	0	0	0	1	0	0	0	0	9	0	0	1
TRENT	6/9/89	0	7	2	0	0	0	0	1	0	0	0	0	11	0	1	1
TRENT	6/10/89	0	7	5	0	0	0	0	2	2	0	0	0	11	0	0	2
TRENT	6/11/89	0	3	2	0	0	0	0	0	0	0	0	0	9	0	0	1
TRENT	6/12/89	0	4	1	1	0	1	0	2	6	0	0	0	10	0	0	1
TRENT	6/13/89	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRENT	6/14/89	0	2	0	0	0	0	2	0	0	0	0	0	4	0	0	0
TRENT	6/15/89	0	2	0	0	0	0	0	2	0	0	0	0	1	1	0	0
TRENT	6/16/89	0	3	1	0	0	1	0	0	0	0	0	0	5	0	1	0
TRENT	6/17/89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
TRENT	6/18/89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
TRENT	6/19/89	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRENT	6/20/89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
TRENT	6/21/89	0	2	0	0	0	0	0	0	0	0	0	0	3	0	1	0
	Total	9	443	545	36	0	14	3	63	24	0	2	0	1145	5	8	2501

APPENDIX D

Coded wire tagging data for Black Creek, French Creek, and the Trent River, 1989.

Appendix D. Coded wire tagging data for Black Creek, French Creek, and Trent River, 1989.

System	Date	Tag code	Smolt size	Smolt origin	Tags used	Tag morts	Tag rejects	Number tagged	Number released
BLACK	4/15/89	82646	L	W	3	1	0	3	2
BLACK	4/16/89	82646	L	W	13	0	0	13	13
BLACK	4/17/89	82646	L	W	48	1	7	41	40
BLACK	4/18/89	82646	L	W	68	0	3	65	65
BLACK	4/19/89	82646	L	W	41	0	0	41	41
		Total			173	2	10	163	161
BLACK	4/20/89	82516	L	W	24	0	0	24	24
BLACK	4/21/89	82516	L	W	114	0	1	114	113
BLACK	4/22/89	82516	L	W	96	0	4	92	92
BLACK	4/23/89	82516	L	W	100	0	0	100	100
BLACK	4/24/89	82516	L	W	157	1	5	151	151
BLACK	4/25/89	82516	L	W	380	0	10	370	370
BLACK	4/26/89	82516	L	W	601	0	9	592	592
BLACK	4/27/89	82516	L	W	269	1	4	264	264
BLACK	4/28/89	82516	L	W	321	0	5	316	316
BLACK	4/29/89	82516	L	W	354	0	10	344	344
BLACK	4/30/89	82516	L	W	438	0	5	432	432
		Total			2854	2	53	2799	2798
BLACK	5/1/89	81609	L	W	706	0	4	702	702
BLACK	5/2/89	81609	L	W	541	0	6	535	535
BLACK	5/3/89	81609	L	W	149	0	0	144	144
BLACK	5/4/89	81609	L	W	368	1	1	366	366
BLACK	5/5/89	81609	L	W	256	0	0	256	256
BLACK	5/6/89	81609	L	W	485	0	1	484	484
BLACK	5/7/89	81609	L	W	150	0	0	150	150
BLACK	5/8/89	81609	L	W	139	0	2	137	137
BLACK	5/9/89	81609	L	W	166	0	15	151	151
BLACK	5/10/89	81609	L	W	259	0	0	259	259
		Total			3219	1	29	3184	3184
BLACK	5/11/89	82639	L	W	559	0	2	557	557
BLACK	5/12/89	82639	L	W	183	0	0	183	183
BLACK	5/13/89	82639	L	W	32	0	0	32	32
BLACK	5/14/89	82639	L	W	11	0	0	11	11
BLACK	5/15/89	82639	L	W	22	0	0	22	22
		Total			807	0	2	805	805
BLACK	5/16/89	82617	L	W	14	0	0	14	14
BLACK	5/17/89	82617	L	W	6	0	0	6	6
BLACK	5/18/89	82617	L	W	412	2	0	410	410
BLACK	5/19/89	82617	L	W	23	0	0	23	23
		Total			455	2	0	453	453

Appendix D. Coded wire tagging data for Black Creek, French Creek, and Trent River, 1989.

System	Date	Tag code	Smolt size	Smolt origin	Tags used	Tag morts	Tag rejects	Number tagged	Number released
BLACK	5/20/89	82618	L	W	7	0	0	7	7
BLACK	5/21/89	82618	L	W	15	0	0	15	15
BLACK	5/22/89	82618	L	W	17	0	0	17	17
BLACK	5/23/89	82618	L	W	30	0	0	30	30
BLACK	5/24/89	82618	L	W	46	0	0	46	46
BLACK	5/25/89	82618	L	W	865	0	8	857	857
BLACK	5/26/89	82618	L	W	130	0	2	128	128
BLACK	5/27/89	82618	L	W	166	0	0	166	166
BLACK	5/28/89	82618	L	W	143	0	2	141	141
BLACK	5/29/89	82618	L	W	146	0	0	146	146
BLACK	5/30/89	82618	L	W	343	0	0	343	343
BLACK	5/31/89	82620	L	W	56	0	0	56	56
BLACK	6/1/89	82620	L	W	180	0	0	180	180
BLACK	6/2/89	82620	L	W	130	0	0	130	130
		Total			2274	0	12	2262	2262
BLACK	6/3/89	82638	L	W	90	0	0	90	90
BLACK	6/4/89	82638	L	W	41	0	0	41	41
BLACK	6/5/89	82638	L	W	96	0	0	96	96
BLACK	6/6/89	82638	L	W	5	0	0	5	5
BLACK	6/7/89	82638	L	W	1	0	0	1	1
BLACK	6/8/89	82638	L	W	1	0	0	1	1
BLACK	6/9/89	82638	L	W	0	0	0	0	0
BLACK	6/10/89	82638	L	W	0	0	0	0	0
BLACK	6/11/89	82638	L	W	0	0	0	0	0
BLACK	6/12/89	82638	L	W	2	0	0	2	2
BLACK	6/13/89	82638	L	W	2	0	0	2	2
BLACK	6/14/89	82638	L	W	0	0	0	0	0
BLACK	6/15/89	82638	L	W	0	0	0	0	0
BLACK	6/16/89	82638	L	W	0	0	0	0	0
		Total			238	0	0	238	238
BLACK	4/15/89	82615	S	W	2	1	0	2	1
BLACK	4/16/89	82615	S	W	0	0	0	0	0
BLACK	4/17/89	82615	S	W	4	1	0	4	3
BLACK	4/18/89	82615	S	W	5	0	0	5	5
BLACK	4/19/89	82615	S	W	2	0	0	2	2
		Total			13	2	0	13	11
BLACK	4/20/89	82645	S	W	1	0	0	1	1
BLACK	4/21/89	82645	S	W	7	0	0	7	7
BLACK	4/22/89	82645	S	W	9	0	0	9	9
BLACK	4/23/89	82645	S	W	16	0	2	14	14

Appendix D. Coded wire tagging data for Black Creek, French Creek, and Trent River, 1989.

System	Date	Tag code	Smolt size	Smolt origin	Tags used	Tag morts	Tag rejects	Number tagged	Number released
BLACK	4/24/89	82645	S	W	37	1	0	36	36
BLACK	4/25/89	82645	S	W	117	0	4	113	113
BLACK	4/26/89	82645	S	W	137	0	0	137	137
BLACK	4/27/89	82645	S	W	62	0	0	62	62
BLACK	4/28/89	82645	S	W	175	0	20	155	155
BLACK	4/29/89	82645	S	W	99	1	0	98	98
BLACK	4/30/89	82645	S	W	99	0	0	99	99
		Total			759	2	26	731	731
BLACK	5/1/89	82514	S	W	211	0	0	211	211
BLACK	5/2/89	82514	S	W	179	0	0	179	179
BLACK	5/3/89	82514	S	W	76	1	0	75	75
BLACK	5/4/89	82514	S	W	416	3	1	413	413
BLACK	5/5/89	82514	S	W	26	0	0	26	26
BLACK	5/6/89	82514	S	W	366	0	5	361	361
BLACK	5/7/89	82514	S	W	212	0	6	206	206
BLACK	5/8/89	82514	S	W	35	0	0	35	35
BLACK	5/9/89	82514	S	W	280	1	4	275	275
BLACK	5/10/89	82514	S	W	359	2	0	357	357
		Total			2160	7	16	2138	2138
BLACK	5/11/89	82631	S	W	2108	6	6	2091	2091
BLACK	5/12/89	82631	S	W	509	0	0	509	509
BLACK	5/13/89	82631	S	W	126	0	1	125	125
BLACK	5/14/89	82631	S	W	27	0	0	27	27
BLACK	5/15/89	82631	S	W	113	0	0	113	113
		Total			2883	6	7	2865	2865
BLACK	5/16/89	81611	S	W	102	0	1	101	101
BLACK	5/17/89	81611	S	W	62	0	0	62	62
BLACK	5/18/89	81611	S	W	1286	0	9	1277	1277
BLACK	5/19/89	81611	S	W	66	0	0	66	66
		Total			1516	0	10	1506	1506
BLACK	5/20/89	81610	S	W	87	0	1	86	86
BLACK	5/21/89	81610	S	W	127	0	0	127	127
BLACK	5/22/89	81610	S	W	115	1	0	114	114
BLACK	5/23/89	81610	S	W	243	0	0	243	243
BLACK	5/24/89	81610	S	W	386	1	1	384	384
BLACK	5/25/89	81610	S	W	3131	1	39	3091	3091
BLACK	5/26/89	81610	S	W	1152	0	2	1150	1150
BLACK	5/27/89	81610	S	W	653	0	2	651	651
BLACK	5/28/89	81610	S	W	845	1	6	838	838
BLACK	5/29/89	81610	S	W	726	0	5	721	721

Appendix D. Coded wire tagging data for Black Creek, French Creek, and Trent River, 1989.

System	Date	Tag code	Smolt size	Smolt origin	Tags used	Tag morts	Tag rejects	Number tagged	Number released
BLACK	5/30/89	81610	S	W	1732	1	5	1726	1726
BLACK	5/31/89	81610	S	W	190	0	0	190	190
BLACK	6/1/89	81610	S	W	873	0	4	869	869
BLACK	6/2/89	81610	S	W	752	1	1	750	750
		Total			11012	6	66	10940	10940
BLACK	6/3/89	81606	S	W	658	0	1	657	657
BLACK	6/4/89	81606	S	W	219	0	0	219	219
BLACK	6/5/89	81606	S	W	417	0	0	417	417
BLACK	6/6/89	81606	S	W	11	0	0	11	11
BLACK	6/7/89	81606	S	W	21	0	0	21	21
BLACK	6/8/89	81606	S	W	12	0	0	12	12
BLACK	6/9/89	81606	S	W	6	0	0	6	6
BLACK	6/10/89	81606	S	W	4	0	0	4	4
BLACK	6/11/89	81606	S	W	16	0	1	15	15
BLACK	6/12/89	81606	S	W	5	0	0	5	5
BLACK	6/13/89	81606	S	W	11	0	0	11	11
BLACK	6/14/89	81606	S	W	6	0	0	6	6
		Total			1386	0	2	1384	1384
FRENCH	4/18/89	82642		H	13	1	1	12	11
FRENCH	4/20/89	82642		H	28	0	0	28	28
FRENCH	4/22/89	82642		H	11	0	0	11	11
FRENCH	4/24/89	82642		H	10	0	0	10	10
FRENCH	4/26/89	82642		H	44	0	0	44	44
FRENCH	4/28/89	82642		H	104	0	1	103	103
FRENCH	4/30/89	82642		H	147	0	0	147	147
FRENCH	5/1/89	82642		H	0	0	0	0	0
FRENCH	5/2/89	82642		H	0	0	0	0	0
FRENCH	5/3/89	82642		H	0	0	0	0	0
FRENCH	5/4/89	82642		H	49	1	0	48	48
FRENCH	5/5/89	82642		H	75	0	1	74	74
FRENCH	5/6/89	82642		H	88	0	0	88	88
FRENCH	5/7/89	82642		H	46	0	0	46	46
FRENCH	5/8/89	82642		H	6	0	0	6	6
FRENCH	5/9/89	82642		H	54	0	0	54	54
FRENCH	5/10/89	82642		H	18	0	0	18	18
FRENCH	5/11/89	82642		H	0	0	0	0	0
FRENCH	5/12/89	82642		H	7	0	0	7	7
FRENCH	5/13/89	82642		H	6	0	0	6	6
FRENCH	5/14/89	82642		H	11	0	0	11	11
FRENCH	5/15/89	82642		H	8	1	0	7	7
FRENCH	5/16/89	82642		H	4	0	0	4	4
FRENCH	5/17/89	82642		H	6	0	0	6	6

Appendix D. Coded wire tagging data for Black Creek, French Creek, and Trent River, 1989.

System	Date	Tag code	Smolt size	Smolt origin	Tags used	Tag morts	Tag rejects	Number tagged	Number released
FRENCH	5/18/89	82642		H	3	0	0	3	3
FRENCH	5/19/89	82642		H	2	0	0	2	2
FRENCH	5/20/89	82642		H	2	0	0	2	2
FRENCH	5/21/89	82642		H	0	0	0	0	0
FRENCH	5/22/89	82642		H	1	0	0	1	1
FRENCH	5/23/89	82642		H	2	0	0	2	2
FRENCH	5/24/89	82642		H	2	0	0	2	2
FRENCH	5/25/89	82642		H	0	0	0	0	0
FRENCH	5/26/89	82642		H	1	0	0	1	1
FRENCH	5/27/89	82642		H	1	0	0	1	1
FRENCH	5/28/89	82642		H	0	0	0	0	0
FRENCH	5/29/89	82642		H	0	0	0	0	0
FRENCH	5/30/89	82642		H	0	0	0	0	0
FRENCH	5/31/89	82642		H	0	0	0	0	0
FRENCH	6/1/89	82642		H	1	0	0	1	1
FRENCH	6/2/89	82642		H	1	0	0	1	1
FRENCH	6/3/89	82642		H	0	0	0	0	0
FRENCH	6/4/89	82642		H	0	0	0	0	0
FRENCH	6/5/89	82642		H	0	0	0	0	0
FRENCH	6/6/89	82642		H	1	0	0	1	1
FRENCH	6/7/89	82642		H	0	0	0	0	0
FRENCH	6/8/89	82642		H	0	0	0	0	0
FRENCH	6/9/89	82642		H	1	0	0	1	1
FRENCH	6/10/89	82642		H	0	0	0	0	0
FRENCH	6/11/89	82642		H	0	0	0	0	0
FRENCH	6/12/89	82642		H	0	0	0	0	0
FRENCH	6/13/89	82642		H	0	0	0	0	0
FRENCH	6/14/89	82642		H	0	0	0	0	0
FRENCH	6/15/89	82642		H	0	0	0	0	0
		Total			753	3	3	748	747
FRENCH	4/18/89	82643		W	4	0	0	4	4
FRENCH	4/20/89	82643		W	44	0	1	43	43
FRENCH	4/22/89	82643		W	16	0	0	16	16
FRENCH	4/24/89	82643		W	11	1	0	10	10
FRENCH	4/26/89	82643		W	15	0	0	15	15
FRENCH	4/28/89	82643		W	61	0	10	51	51
FRENCH	4/30/89	82643		W	92	0	0	92	92
FRENCH	5/1/89	82643		W	0	0	0	0	0
FRENCH	5/2/89	82643		W	0	0	0	0	0
FRENCH	5/3/89	82643		W	0	0	0	0	0
FRENCH	5/4/89	82643		W	80	0	1	79	79
FRENCH	5/5/89	82643		W	102	1	0	101	101
FRENCH	5/6/89	82643		W	295	0	0	295	295

Appendix D. Coded wire tagging data for Black Creek, French Creek, and Trent River, 1989.

System	Date	Tag code	Smolt size	Smolt origin	Tags used	Tag morts	Tag rejects	Number tagged	Number released
FRENCH	5/7/89	82643		W	190	0	2	188	188
FRENCH	5/8/89	82643		W	68	0	0	68	68
FRENCH	5/9/89	82643		W	401	0	0	401	401
FRENCH	5/10/89	82643		W	392	0	1	391	391
		Total			1771	2	15	1754	1754
FRENCH	5/11/89	82511		W	179	0	4	175	175
FRENCH	5/12/89	82511		W	361	1	1	359	359
FRENCH	5/13/89	82511		W	353	4	4	345	345
FRENCH	5/14/89	82511		W	270	0	0	270	270
FRENCH	5/15/89	82511		W	267	0	1	266	266
FRENCH	5/16/89	82511		W	797	1	1	795	795
FRENCH	5/17/89	82511		W	711	1	2	708	708
FRENCH	5/18/89	82511		W	494	0	10	484	484
FRENCH	5/19/89	82511		W	590	1	12	577	577
		Total			4022	8	35	3979	3979
FRENCH	5/20/89	82513		W	417	0	0	417	417
FRENCH	5/21/89	82513		W	539	1	0	538	538
FRENCH	5/22/89	82513		W	501	1	0	500	500
FRENCH	5/23/89	82513		W	388	2	0	386	386
FRENCH	5/24/89	82513		W	537	0	1	536	536
FRENCH	5/25/89	82513		W	556	0	1	555	555
FRENCH	5/26/89	82513		W	360	0	0	360	360
FRENCH	5/27/89	82513		W	398	2	0	396	396
FRENCH	5/28/89	82513		W	477	0	0	477	477
FRENCH	5/29/89	82513		W	220	0	0	220	220
FRENCH	5/30/89	82513		W	336	2	0	334	334
FRENCH	5/31/89	82513		W	275	0	0	275	275
FRENCH	6/1/89	82513		W	120	0	0	120	120
FRENCH	6/2/89	82513		W	130	0	0	130	130
		Total			5254	8	2	5244	5244
FRENCH	6/3/89	82644		W	136	1	0	135	135
FRENCH	6/4/89	82644		W	53	0	1	52	52
FRENCH	6/5/89	82644		W	58	0	0	58	58
FRENCH	6/6/89	82644		W	53	0	0	53	53
FRENCH	6/7/89	82644		W	41	0	0	41	41
FRENCH	6/8/89	82644		W	34	0	1	33	33
FRENCH	6/9/89	82644		W	12	0	0	12	12
FRENCH	6/10/89	82644		W	25	0	0	25	25
FRENCH	6/11/89	82644		W	17	0	0	17	17
FRENCH	6/12/89	82644		W	4	0	0	4	4
FRENCH	6/13/89	82644		W	5	0	0	5	5

Appendix D. Coded wire tagging data for Black Creek, French Creek, and Trent River, 1989.

System	Date	Tag code	Smolt size	Smolt origin	Tags used	Tag morts	Tag rejects	Number tagged	Number released
FRENCH	6/14/89	82644		W	4	0	0	4	4
FRENCH	6/15/89	82644		W	10	0	0	10	10
		Total			452	1	2	449	449
TRENT	5/1/89	82640		H	162	0	1	161	161
TRENT	5/2/89	82640		H	0	0	0	0	0
TRENT	5/3/89	82640		H	0	0	0	0	0
TRENT	5/4/89	82640		H	119	0	0	119	119
TRENT	5/5/89	82640		H	153	0	1	152	152
TRENT	5/6/89	82640		H	0	0	0	0	0
TRENT	5/7/89	82640		H	842	0	17	835	835
TRENT	5/8/89	82640		H	266	0	0	266	266
TRENT	5/9/89	82640		H	325	1	1	323	323
TRENT	5/10/89	82640		H	423	1	2	420	420
TRENT	5/11/89	82640		H	206	1	0	205	205
TRENT	5/12/89	82640		H	198	0	0	198	198
TRENT	5/13/89	82640		H	216	0	3	213	213
TRENT	5/14/89	82640		H	134	0	0	134	134
TRENT	5/15/89	82640		H	208	0	0	208	208
TRENT	5/16/89	82640		H	290	1	26	263	263
		Total			3542	4	51	3497	3497
TRENT	5/17/89	82623		H	204	2	6	196	196
TRENT	5/18/89	82623		H	422	6	0	422	422
TRENT	5/19/89	82623		H	441	0	3	438	438
TRENT	5/20/89	82623		H	92	0	0	92	92
TRENT	5/21/89	82623		H	193	0	0	193	193
TRENT	5/22/89	82623		H	200	0	0	200	200
TRENT	5/23/89	82623		H	204	0	0	204	204
TRENT	5/24/89	82623		H	478	1	0	477	477
		Total			2234	9	9	2222	2222
TRENT	5/25/89	82507		H	454	1	1	452	452
TRENT	5/26/89	82507		H	275	1	0	274	274
TRENT	5/27/89	82507		H	273	0	0	273	273
TRENT	5/28/89	82507		H	127	0	0	127	127
TRENT	5/29/89	82507		H	62	1	0	61	61
TRENT	5/30/89	82507		H	131	0	0	131	131
TRENT	5/31/89	82507		H	204	0	0	204	204
TRENT	6/1/89	82507		H	196	0	1	195	195
TRENT	6/2/89	82507		H	271	0	1	270	270
TRENT	6/3/89	82507		H	100	0	0	100	100
TRENT	6/4/89	82507		H	201	0	1	200	200
TRENT	6/5/89	82507		H	319	0	3	316	316

Appendix D. Coded wire tagging data for Black Creek, French Creek, and Trent River, 1989.

System	Date	Tag code	Smolt size	Smolt origin	Tags used	Tag morts	Tag rejects	Number tagged	Number released
TRENT	6/6/89	82507		H	172	0	0	172	172
TRENT	6/7/89	82507		H	35	0	0	35	35
TRENT	6/8/89	82507		H	94	0	0	94	94
TRENT	6/9/89	82507		H	48	0	0	48	48
TRENT	6/10/89	82507		H	95	1	0	94	94
TRENT	6/11/89	82507		H	31	0	0	31	31
TRENT	6/12/89	82507		H	50	0	0	50	50
TRENT	6/13/89	82507		H	8	0	0	8	8
TRENT	6/14/89	82507		H	0	0	0	0	0
TRENT	6/15/89	82507		H	6	0	0	6	6
		Total			3152	4	7	3141	3141
TRENT	5/1/89	82505		W	26	0	0	26	26
TRENT	5/2/89	82505		W	0	0	0	0	0
TRENT	5/3/89	82505		W	0	0	0	0	0
TRENT	5/4/89	82505		W	17	0	0	17	17
TRENT	5/5/89	82505		W	25	0	0	25	25
TRENT	5/6/89	82505		W	0	0	0	0	0
TRENT	5/7/89	82505		W	150	0	0	150	150
TRENT	5/8/89	82505		W	32	0	2	30	30
TRENT	5/9/89	82505		W	14	0	0	14	14
TRENT	5/10/89	82505		W	26	0	0	26	26
TRENT	5/11/89	82505		W	31	0	0	31	31
TRENT	5/12/89	82505		W	64	0	0	64	64
TRENT	5/13/89	82505		W	65	0	0	65	65
TRENT	5/14/89	82505		W	30	0	0	30	30
TRENT	5/15/89	82505		W	48	0	0	48	48
TRENT	5/16/89	82505		W	70	1	2	67	67
TRENT	5/17/89	82505		W	65	0	3	62	62
TRENT	5/18/89	82505		W	181	0	0	181	181
TRENT	5/19/89	82505		W	184	0	0	184	184
TRENT	5/20/89	82505		W	151	0	0	151	151
TRENT	5/21/89	82505		W	80	0	0	80	80
TRENT	5/22/89	82505		W	101	0	0	101	101
TRENT	5/23/89	82505		W	0	0	0	0	0
TRENT	5/24/89	82505		W	203	0	0	203	203
		Total			1563	1	7	1555	1555
TRENT	5/25/89	82641		W	265	1	1	263	263
TRENT	5/26/89	82641		W	140	0	0	140	140
TRENT	5/27/89	82641		W	122	0	1	121	121
TRENT	5/28/89	82641		W	100	0	0	100	100
TRENT	5/29/89	82641		W	52	0	1	51	51
TRENT	5/30/89	82641		W	86	0	1	85	85

Appendix D. Coded wire tagging data for Black Creek, French Creek, and Trent River, 1989.

System	Date	Tag code	Smolt size	Smolt origin	Tags used	Tag morts	Tag rejects	Number tagged	Number released
TRENT	5/31/89	82641		W	157	1	2	154	154
TRENT	6/1/89	82641		W	154	0	0	154	154
TRENT	6/2/89	82641		W	119	0	0	119	119
TRENT	6/3/89	82641		W	43	0	0	43	43
TRENT	6/4/89	82641		W	114	0	0	114	114
TRENT	6/5/89	82641		W	223	0	0	223	223
TRENT	6/6/89	82641		W	114	0	0	114	114
TRENT	6/7/89	82641		W	38	0	0	38	38
TRENT	6/8/89	82641		W	63	0	0	63	63
TRENT	6/9/89	82641		W	31	0	0	31	31
TRENT	6/10/89	82641		W	34	0	0	34	34
TRENT	6/11/89	82641		W	24	0	0	24	24
TRENT	6/12/89	82641		W	22	1	0	21	21
TRENT	6/13/89	82641		W	9	0	0	9	9
TRENT	6/14/89	82641		W	0	0	0	0	0
TRENT	6/15/89	82641		W	5	0	0	5	5
		Total			1915	3	6	1906	1906